THE

SURGICAL CLINICS

OF

CHICAGO

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DaCosta's Modern Surgery

Since the publication of the former edition of this book surgical advances have been so many and of such great importance that Dr DaCosta found it necessary virtually to rewrite his book. The World War particularly brought forward many methods of diagnosis and treatment which have greatly influenced civil and industrial surgical practice. These Dr DaCosta has critically analyzed and summarized.

In order to keep the vast amount of matter within the limits of one volume, a larger type page was adopted. Notwithstanding this measure, nearly 200 pages were required to accommodate the new material.

Some of the New Matter

Dakin-Carrel Dehelly DePage antiseptics.

Dichloramin-T—its preparation and use

Direct laryngoscopy bronchoscopy esophagoscopy and gastroscopy (by Dr Chevalier Jackson)

Matas' collateral efficiency test in aneurysm.

Phosphorus necrosis.

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Diverticula of bladder

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Excision of infected wounds

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Electro-coagulation.

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CONTRIBUTORS TO THIS NUMBER

ARTHUR DEAN BEVAN M D Professor of Surgery at Rush Medical College in Affiliat on with the Univers ty of Chicago Surgeon to the Presbyterian Hosp tal Chicago.

EDWARD LYMAN CORNELL M D Attending Obstetrician Chicago Lying in Hosp tal and Dispensary Attend ng Obstetr cian Provident Hosp tal Associate in Obstetrics Northwestern Univers ty Medical School

DANIEL N EISENDRATH M D Clinical Professor of Surgery Rush Medical College Chicago Attending Surgeon M chael Reese and Cook County Hospitals Chicago

FREDERICK HOWARD FALLS M D Cook County Hosp tal

DR GATEWOOD Instructor in Surgery Rush Medical College Chicago

ALLEN B KANAVEL M D Assistant Professor of Surgery Northwestern Un versity Medical School Attending Surgeon Wesley Memorial and Cook County Hospitals, Ch cago

HERMAN L KRETSCHMER, M D Urologist Presbyterian Hospital Assistant in Genito-urinary Surgery Rush Medical College Chicago

GOLDER L McWHORTER M D Instructor in Surgery Rush Medical College Chicago

ROY L MOODIE M D Assistant Professor of Anatomy College of Medicine University of Illinois

EDWARD LOUIS MOORHEAD M D Chief of Staff and Senior Surgeon Mercy Hosp tal Chicago. Adjunct Clinical Professor of Surgery Northwestern University Medical School

GEORGE E SHAMBAUGH M D Professor of Otology and Laryngology Rush Medical College Chicago Otologist to the Presbyterian Hosp tal Ch cago

DAVID C STRAUS M D Attending Surgeon Cook County Hosp tal Ch cago Associate Attend ng Surgeon Michael Reese Hospital Chicago D rector of the Department of Surgery Michael Reese Dispensary Chicago Assistant in Surgery Rush Medical College Chicago

ALFRED A STRAUSS M D Michael Reese Hosp tal Chicago

CONTENTS

CLINIC OF DR. ALLEN B KANAVEL

WESLEY MEMORIAL HOSPITAL

EMPYEMA

Summary Demonstration of two patients and a discussion of the treatment
of empyema with especial reference to methods of draining, sterilizing,
and obliterating empyema cavities

A FEW weeks ago we discussed the etiology and pathology of
empyema Today I wish to present to you 2 patients, both
suffering from the presence of pus in the pleural cavity, and to
discuss in some detail the question of the treatment of empyema

CASE I —This patient is a child of five years, whose trouble
began in January, 1919, with a severe attack of influenza, lasting
for about three months Three weeks after the onset of the
trouble her mother noticed the presence of a swelling of the left
side of the chest, and that the patient always lay on the left side
if undisturbed In March she was allowed to get up, and re-
mained up and about until December 1st, but with a constant
cough, and more or less persistent fever About November
1st her mother first noticed that her breath was very foul One
week later the patient coughed up 2 tablespoonsful of blood

On December 1st she was admitted to this hospital with a
temperature of 102° F , a leukocyte count of 21,000, and the
physical signs of fluid in the left side of the chest

Three weeks ago the pleural cavity was opened by a resection
of 1 inch of the seventh rib The cavity was drained and nega-
tive pressure established, but the negative pressure was not
effectively maintained, so that now she has an extensive pneumo-
thorax, the heart is definitely displaced to the right, and her
general condition is rather worse than when this third drainage
was carried out

CASE II—This patient is a young man twenty four years of age. His trouble began in December, 1915, with a cold and general malaise, lasting for about a week. On December 30th he became acutely ill with the symptoms of a severe pulmonary infection—pain in the chest, headache, vomiting, and high fever. On New Year's day he was taken to St. Luke's Hospital. After a week's stay in the hospital the chest was aspirated and some bloody fluid and pus removed. About five hours later he began to cough violently and complain of terrific pain in the right side of the chest. At 5 o'clock of the same day a rib resection was performed under nitrous oxid anesthesia and a tube placed in the pleural cavity for drainage. No suction was applied at that time. Five weeks later the tube was removed and the wound allowed to close. He left the hospital one week after the removal of the tube with the wound healed. About six months after leaving the hospital the patient returned to work and remained fairly well for about a year

. . . .

. . . .

intervals for the next nine months and was accompanied by loss of weight with an afternoon rise of temperature and frequent cough ing spells with the expectoration of thick brownish red sputum

In September 1917 the chest was aspirated and considerable thick green pus removed. This procedure was repeated several times and was followed each time by a temporary disappearance of the afternoon fever and a temporary gain in weight. In October, 1917, under chloroform anesthesia two tubes were placed in the pleural cavity for drainage. One tube was removed after several weeks and the second a flanged silver tube was left in place until the patient entered this hospital in June 1919—a period of twenty-one months. Throughout that time thick, greenish pus was draining from the wound so that the patient required constant care and a change of dressings twice daily

I have gone into this history in some detail to impress upon you the seriousness of the condition from the patient's standpoint

and the futility of half way measures of treatment   From
December 1916 when the splashing sound was first noticed in
his chest until June 1919 a period of thirty-one months this
patient was absorbing toxins from an extensive area of infection
Throughout that time he was almost constantly under a phys
ician s care subjected to considerable expense to great personal
discomfort and confronted with the serious possibility of per
manent invalidism

When he entered the hospital in June 1919 thick green pus
was draining from a silver tube introduced into the right pleural
cavity in the sixth interspace   The skin about the wound
was red and inflamed for a considerable distance   After inject
ing a few ounces of thin bismuth paste into the sinus a radiogram
was made which showed a cavity extending from the diaphragm
to the level of the third rib and compressing the lung to about
one-third its normal size (Fig 169 or p 478)

Under novocain anesthesia 1½ inches of the seventh rib were
removed the bismuth paste was washed out with sterile olive
oil and two Carrel tubes threaded on silver wire were introduced
into the pleural cavity   Two hourly instillations of Dakin s
fluid were begun and the bacterial count which at the beginning
of treatment was very high gradually fell to zero

On July 17th twenty seven days after admission the patient
left the hospital with the sinus in his chest about the size of a
No 15 catheter and with a very thin serous discharge still
present which contained a few pus cells but no organisms on
smear or culture   His general condition was much improved
and he had gained 8 pounds in weight

From July 17th until October 6th the patient returned to the
hospital at first twice weekly and later three times weekly for
change of dressings   At each dressing from 15 to 20 cc of 5
per cent dichloramin T in chlorcosane were injected with a sterile
catheter but the organisms gradually reappeared in the chest
fluid and at times the patient s afternoon temperature rose to
99 6° F

On October 6th the patient again entered the hospital and
since that time nine weeks ago we have again succeeded in

bringing the bacterial count to zero by the two-hourly instillation of Dakin's fluid

While the patient was in the hospital in June and July and following his discharge we attempted to bring the compressed lung out to the chest wall by positive pressure—i e by having the patient force the water from one demijohn into a second by blowing into the former through a tube When he returned to the hospital the second time we combined this exercise with suction from without with the Perthes apparatus In spite of these procedures we have not succeeded in diminishing the size of the cavity in the chest or of rendering it impotent as a source of future trouble We have been able to counteract the infection and so bring about a considerable improvement in his general condition

practice and it is this problem . . . of disease . . . in you In the first place let me emphasize the fact that our failures in the treatment of empyema as well as in the treatment of other diseases are due more to our lack of application of surgical principles than to mistakes in operative technic One fault with us as physicians is that we tend to apply a routine treatment in all cases We acquire the habit of using Brown's or Jones' or Smith's operation, without stopping to realize that no one method of treatment is applicable to all cases We fall into the error of always aspirating or resecting a rib or using some single method of establishing negative pressure instead of studying the changed physiology of the respiratory tract and the character of the pathologic process going on in the lung and pleural cavity

At the beginning of the epidemic of empyema which occurred during the war primary resection of a rib was the routine method of treatment later aspiration became the method of choice We now feel certain men who say all cases of empyema should have rib resection and drainage while others say that all patients with empyema should be treated by aspiration It was my

privilege to have charge of the work on empyema in this country during the war At the time we assumed general supervision of these cases there were 980 patients with empyema of whom a large percentage had drained for a considerable period of time We began our work with the aid of a commission in each of the camps for the intensive study of every case and with a general commission supervising the entire work The result of our studies forcibly impressed upon us the fact that before instituting any method of treatment one must understand the pathologic condition present and the state of the patient s resistance and then apply to that patient the particular method of treatment indicated

In civil life a considerable number of our patients have empyema due to the pneumococcus A smaller group but still a considerable number have empyema due to the streptococcus while at other times it may be due to the staphylococcus or the tubercle bacillus The inception of the disease and the pathologic reaction are essentially different in the different types With a streptococcic infection a patient is ordinarily suffering not alone from an infection of the pleural cavity but from a serious systemic infection as well and frequently from an associated involvement of the other serous cavities of the body With pneumococcus infections although the patient has a systemic infection the chief pathologic change is in the lung and pleura With streptococcic infections the local pathologic condition consists in the presence of an exudate containing many streptococci a few leukocytes and a considerable amount of fibrin Because of the virulence of the infection there is no attempt on the part of the pleura to form adhesions by the reduplication of its cells At the end of the first week we will find the pleural cavity filled with a large amount of fluid the lung collapsed and no adhesions present At the end of the second week if the patient survives the virulence of the infection diminishes and the process gradually becomes localized During the third week reduplication of the pleural epithelium begins and adhesions are formed With pneumococcic infections on the other hand adhesions develop early which wall off the pus cavity

and definitely localize the pathologic process. With streptococcus infections, since the pleural surfaces are not adherent, the lung is compressed toward the mediastinum and away from the diaphragm; with pneumococcus infections the formation of adhesions may prevent, to some extent, retraction of the lung. The tuberculous type may resemble either of the above types, for the pathologic process depends to a considerable extent upon the addition of a mixed infection from the lung and bronchioles to the sterile effusion previously present. In this type the frequent presence of a bronchopleural fistula adds a new complication to the difficulties of treatment.

The obvious conclusion is that the early stages of a streptococcic empyema demand a different plan of treatment from a pneumococcic empyema. A patient with a streptococcic empyema, with a systemic infection, with a possible involvement of other portions of the body, will not stand any severe surgical operation. If the chest is opened and drained, an open pneumothorax is created, which increases the difficulty rather than decreases it, since it adds tremendously to the handicap under which the heart and lungs are already working.

In this connection I wish to call your attention to the splendid experimental work carried out by Graham and Bell, of the Empyema Commission.[1] They showed that, contrary to the

move to one side or the other, and so permit an approximation of the pressure within the two pleural cavities and of the compression of the two lungs. In other words, if we speak of the affected side and the sound side we are deceiving ourselves, for the compression of the two lungs is approximately equal, and the conception of one lung working without let or hindrance, in spite of an extensive pneumothorax on the opposite side, is erroneous.

They showed further that the danger from an open pneumo-

[1] Graham, E. A., and Bell, R. D.: Am. J. M. Sci., 1918, clvi, 839–871

thorax depended directly upon the size of the opening into the pleural cavity If the opening was small the increased pressure within the pleural cavity might be compensated for by an increased rate and amplitude of respiration but as the size of the opening approached that of the tracheal inlet and the competition of the two for air became equal not even the greatest possible rate and amplitude of respiration would suffice to draw sufficient air into the compressed lungs If moreover the size of the tracheal inlet were diminished by reason of a tracheo bronchitis with its accompanying edema and exudation the margin of safety became markedly reduced If on the other hand an open pneumothorax spontaneously or artificially created were converted into a closed pneumothorax respiratory embarrassment ceased almost immediately This fact has been shown clinically innumerable times but I do not believe the physiologic problem involved was correctly appreciated before Graham and Bell carried out their experiments

I need only mention two types of cases to emphasize the clinical importance of these observations You who have been interested in war surgery of the lungs and pleura will remember the emphasis laid upon the importance of closing gaping wounds of the chest at the earliest possible moment at the regimental aid post or post or even on the field itself with no equipment other than a stout curved needle and a bit of catgut or even ordinary cord We did not quite appreciate the significance of it but we recognized the fact that an open pneumothorax with a big opening into the pleural cavity meant speedy asphyxia and death Another striking example of the same fact occurred here in the hospital just after the first patient was operated upon for the first time Following the resection of a rib a tube was placed in the pleural cavity for drainage and to this tube was attached a longer tube which was to be connected with the suction apparatus The suction apparatus was not ready for use so the end of the tube was allowed to hang in an open bottle for some hours At the end of that time when she was seen by the surgeon she was breathing about 50 times per minute and was evidently in great respiratory distress In other words she was attempting by

and definitely localize the pathologic process With streptococcus infections since the pleural surfaces are not adherent the lung is compressed toward the mediastinum and away from the diaphragm with pneumococcus infections the formation of adhesions may prevent, to some extent retraction of the lung The tuberculous type may resemble either of the above types for the pathologic process depends to a considerable extent upon the addition of a mixed infection from the lung and bronchioles to the sterile effusion previously present In this type the frequent presence of a bronchopleural fistula adds a new complication to the difficulties of treatment.

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In this connection I wish to call your attention to the splendid experimental work carried out by Graham and Bell of the Empyema Commission [1] They showed that, contrary to the generally accepted belief the pressure in the two pleural cavities when one or the other is opened is practically equal that instead of being fixed and rigid the mediastinal structures unless their mobility is partially limited by pre-existing adhesions readily move to one side or the other and so permit an approximation of the pressure within the two pleural cavities and of the compression of the two lungs. In other words if we speak of the affected side and the sound side we are deceiving ourselves for the compression of the two lungs is approximately equal and the conception of one lung working without let or hindrance in spite of an extensive pneumothorax on the opposite side is erroneous

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1 Graham, E. A., and Bell R D Am. J M Sci., 1918, clvi, 839–871

tured The use of a sharp pointed needle with a long beveled end should be scrupulously avoided

As the general condition of the patient improves he gradually develops a resistance to the infection more and more white blood cells are thrown out so that the pleural fluid instead of being thin and turbid becomes distinctly purulent At the same time adhesions develop between the parietal and visceral pleura which help to limit the pathologic process and which may prevent to some extent retraction of the lung and mediastinum in the event the chest is opened

After eight or ten days it may be wise to introduce drainage between the ribs or to resect a rib Drainage between the ribs is a satisfactory procedure in an individual with wide intercostal spaces which ordinarily means that the individual is in the middle decades of life Under such conditions we can make an incision under local anesthesia between the ribs insert tubes apply aspiration and obtain a satisfactory recovery In younger individuals or in those in whom the chest is not well developed puncture between the ribs and drainage is not particularly satisfactory because the ribs close down and compress the tubes

Dr Diederich [1] of this city while working with empyema cases at Camp Pike Arkansas devised a very satisfactory trocar for introducing intercostal drainage A curved side arm permitted the chest fluid to be aspirated when the stylet was withdrawn and the bore of the instrument was sufficiently large to permit the introduction of a rubber catheter which was left in the pleural cavity after the trocar was removed and through which the pleural cavity could be irrigated with Dakin's solution In addition to offering a simple method of entering the pleural cavity it afforded an air tight closure about the tube after the trocar was withdrawn

If the fluid is thick and can be aspirated only with difficulty it is wiser to resect a portion of a rib and if possible gently explore the cavity with a finger Not infrequently pockets of pus may become partially shut off from the main cavity by

rapid and deep breathing to counteract the abnormal positive pressure upon the lungs and get enough oxygen into the alveoli to permit aeration of the blood. By simply adding enough water to the bottle to cover the end of the rubber tube the open pneumothorax was converted into a closed one and her respiratory embarrassment was relieved almost immediately.

The principles of the treatment of empyema include three essential factors, first, the removal of the infectious material second the sterilization of the infected cavity third the obliteration of the cavity. With a streptococcic infection complicated by general sepsis it is important that the fluid be removed in such a manner as to prevent the entrance of air into the chest cavity. The general condition of these patients is usually so serious and the lung capacity already so greatly diminished by the antecedent pulmonary involvement that even a small opening into the pleural cavity with the production of an open pneumothorax may prove a fatal strain upon the patient's lowered respiratory function.

In individual cases it may be advisable simply to aspirate enough fluid to lessen the pressure on the heart. As the patient's resistance increases more and more fluid max be removed until finally it is possible to remove the entire accumulation with safety but always in such a manner as will prevent collapse of the lung. A certain proportion of these cases, if aspirated under aseptic conditions will never need resection. A large number will need further treatment. The great disadvantage of repeated aspiration is the difficulty of avoiding the development of a secondary infection. Aspiration with repeated puncture is not without danger to the patient. It is not uncommon at post mortem examination to find a puncture of the diaphragm with peritonitis or a puncture of the pericardium with a resulting pericarditis. It is very easy to pass the needle through the pleural cavity into the lung with a resulting pulmonary abscess on one hand or the secondary infection from the lung of a sterile effusion on the other. For this reason paracentesis should always be carried out with a small trocar which permits the stilet to be withdrawn just before the parietal pleura is punc

could find some means of digesting the exudate and destroying the organisms without injuring the healthy tissues or lowering their reaction, such a method would undoubtedly hasten the process of recovery Such a method is available in the use of Dakin's solution This solution has the property of dissolving organic matter, including of course, the micro organisms we call bacteria If it is introduced into an empyema cavity it will dissolve the fibrin and chronic inflammatory deposit and destroy the organisms If, then, we are able to dissolve this fibrinous exudate which harbors the bacteria and kill the organisms present, we have fulfilled the second essential—the sterilization of the infected cavity It now remains for us to obliterate the cavity

The obliteration of the cavity must be accomplished either by bringing the lung out to the chest wall or by bringing the chest wall to the lung The lung may be brought out to the chest wall either by the establishment of a negative pressure in the pleural cavity or by positive pressure within the lung Originally the latter was attempted by having the patient blow against pressure, the so-called "bottle blowing," but this method only pushes the lung out against the parietal pleura for a few moments at a time, and after the pressure is released the lung sinks back to its former position

The establishment of a constant negative pressure offers a much better chance of success for if the pressure is maintained, the lung is constantly pulled out until it is restored to its normal position, or until adhesions between the parietal and visceral pleura permit the obliteration of the cavity In one stage of the pathologic process one method may succeed, while another may fail Under normal conditions a negative pressure of 7 mm of mercury will be sufficient to bring out the lung but if many fibrous adhesions have been formed it may require a negative pressure of 20 or 30 mm

Over thirty years ago the siphon method of treatment was introduced A tube was placed in the chest wall and the connection between the tube and the chest wall made air tight The contents were siphoned off, but the walls of the cavity were

newly forming adhesions and unless these are broken down drainage will be incomplete

This operation should always be carried out under local anesthesia for the administration of a general anesthetic heaps an extra load on the already overburdened heart. You will have no difficulty if you will work gently and avoid pulling on the soft tissues. You will remember that the periosteum is very sensitive and should always be separately injected before you begin to reflect it from the rib

Drainage should be instituted over the point where the pus is located and in such a way that the site of drainage is at the most dependent portion of the pus cavity when the patient is in a comfortable position Many text books state that drainage should always be instituted in a certain place for instance in the seventh interspace along the midaxillary line It is much more important to determine by careful physical examination and with the help of the x ray the lowest point of the infected area with the patient in the most comfortable position and to establish drainage at that point. If after opening the pleural cavity you should find that you are some little distance above the lowest level it is wiser to make a second opening than to attempt to drain the infected cavity from above The objection that the diaphragm may press against the tube and prevent drainage is more theoretical than practical I have never seen but one case in which I thought that accident occurred

The institution of drainage does not remove all the sources of difficulty It allows free pus to escape but it does not remove the plastic exudate which covers the walls of the cavity In streptococcic empyemas this exudate contains a large amount of fibrin. In the more chronic conditions the exudate becomes organized with the formation of dense adhesions between the visceral and parietal pleura Many years ago surgeons advocated opening the chest wall and removing the exudate by scraping it out. Patients with empyema however have not sufficient vitality to stand such a severe operation nor can we be sure that we are removing only diseased tissue and not breaking down nature's barrier to the spread of the infection If we

could find some means of digesting the exudate and destroying the organisms without injuring the healthy tissues or lowering their reaction such a method would undoubtedly hasten the process of recovery Such a method is available in the use of Dakin s solution This solution has the property of dissolving organic matter including of course the micro-organisms we call bacteria If it is introduced into an empyema cavity it will dissolve the fibrin and chronic inflammatory deposit and destroy the organisms If then we are able to dissolve this fibrinous exudate which harbors the bacteria and kill the organisms present we have fulfilled the second essential—the sterilization of the infected cavity It now remains for us to obliterate the cavity

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Drainage should be instituted over the point where the pus is located, and in such a way that the size of drainage is at the most convenient portion of the pus cavity when the patient is in a comfortable position. Many text books state that drainage should always be instituted in a certain place, for instance, in the seventh interspace along the midaxillary line. It is much more convenient to determine by careful physical examination and with the help of the x-ray the lowest point of the affected area with the patient in the most comfortable position, and to establish drainage at that point. If, after opening the parietal cavity you should find that we are some little distance above the lowest level it is wiser to make a second opening than to attempt to drain the affected cavity from above. The objection that the diaphragm may press against the tube and prevent drainage is more theoretical than practical. I have never seen but one case in which I thought this accident occurred.

The institution of drainage does not remove all the sources of difficulty. It allows free pus to escape, but it does not remove the plastic exudate which covers the wall of the cavity. In some cases, empyemas this exudate contains a large amount of lime. In the more chronic conditions the exudate becomes organised, with the formation of dense adhesions between the visceral and parietal pleura. Many years ago surgeons advocated opening the chest wall and removing the exudate by scraping it out. Patients with empyema, however, have not sufficient vitality to stand such a severe operation; and this we do now, that we do not remove only diseased tissue, and by not breaking down nature's barrier to the spread of the infection. I ad-

the tube connected through the drainage bottle to the chest
When the upper bottle is emptied we simply reverse the frame
and the position of the bottles This apparatus renders un
necessary the attachment to the water faucet and makes a
portable arrangement which may be easily moved to any part
of a ward

Fig 164—Rubber patch for securing an air tight closure around drainage tube
in pleural cavity

To maintain a negative pressure within the pleural cavity
it is important that there should be an air tight closure about the
drainage tube passing into the chest   One simple method of
securing such a closure is to draw the rubber drainage tube
through a rubber patch 3 to 4 inches in diameter and cement
or vulcanize the two together in such a way that the union is
air tight (Fig 164) The drainage tube is passed into the pleural

not sterilized nor was the compressed lung drawn out to the chest wall

The use of the water pump for producing negative pressure was suggested by Perthes ten years later and still constitutes the most effective method I know of for drawing the lung out to the chest wall In the first case I showed you we are now producing negative pressure in the pleural cavity by this method The principle of the Perthes water pump is this The drainage tube in the chest leads to a bottle with three glass tubes passing through its rubber stopper To the second tube is attached a rubber hose coming from the pump and to the third a mercury manometer to indicate the negative pressure in the pleural cavity The suction exerted by the aid of the pump exhausts the air from the bottle The negative pressure in the bottle is transmitted to the pleural cavity and the bottle serves as well to catch the secretion aspirated from the cavity

The same method has been utilized in the Bethune apparatus which we have here It consists of two large bottles so placed in a revolving frame that they are end to end with the stop- [illegible] one another One of the bottles [illegible] almost [illegible] these is a direct connection between the bottles so that the water runs from the uppermost bottle into the lower The rate is regulated by a screw clamp on the short rubber connecting tube The second tube in the bottle also extends just through the cork and is connected to a glass tube on the side of the frame which serves as the manometer Since this is a water manometer we must have 13 mm of water in this tube for each millimeter of mercury ordinarily required The third is a long glass tube extending into the bottle to a point above the water level the corresponding tube in the lower bottle is connected to it by a T shaped tube A long rubber tube runs from the side arm of this T tube to the intermediate drainage bottle A tube extends from the drainage bottle to the patient's chest The water dropping from the uppermost bottle into the lower at a regulated rate produces a vacuum and consequently suction on

the tube connected through the drainage bottle to the chest
When the upper bottle is emptied we simply reverse the frame
and the position of the bottles   This apparatus renders un
necessary the attachment to the water faucet and makes a
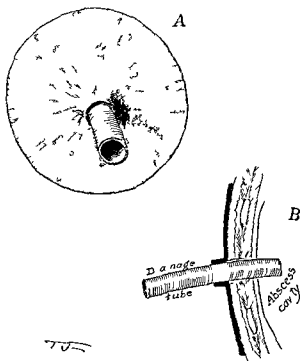portable arrangement which may be easily moved to any part
of a ward

F g 164   Rubber patch fo secu ng a t ght closure around dra nage tube
n pleu a cavity

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not sterilized nor was the compressed lung drawn out to the chest wall

The use of the water pump for producing negative pressure was suggested by Perthes ten years later and still produces the most effective method I know of for drawing the lung out to the chest wall   In the first case I showed you we are now producing negative pressure in the pleural cavity by this method   The principle of the Perthes water pump is this   The drainage tube in the chest leads to a bottle with three glass tubes passing through its rubber stopper   To the second tube is attached a rubber hose coming from the pump and to the third a mercury manometer to indicate the negative pressure in the pleural cavity   The suction exerted by the aid of the pump exhausts the air from the bottle   The negative pressure in the bottle is transmitted to the pleural cavity and the bottle serves as well to catch the secretion aspirated from the cavity

The same method has been utilized in the Bethune apparatus which we have here   It consists of two large bottles so placed in a revolving frame that they are end to end with the stoppered ends proximal to one another   One of the bottles is almost full of water the other empty   Each has a rubber stopper with its three openings as in the simple Perthes method   One of these is a direct connection between the bottles so that the water runs from the uppermost bottle into the lower   The rate is regulated by a screw clamp on the short rubber connecting tube   The second tube in the bottle also extends just through the cork and is connected to a glass tube on the side of the frame which serves as the manometer   Since this is a water manometer we must have 13 mm of water in this tube for each milli meter of mercury ordinarily required   The third is a long glass tube extending into the bottle to a point above the water level the corresponding tube in the lower bottle is connected to it by a T shaped tube   A long rubber tube runs from the side arm of this T tube to the intermediate drainage bottle   A tube extends from the drainage bottle to the patient's chest   The water dropping from the uppermost bottle into the lower at a regulated rate produces a vacuum and consequently suction on

be a foreign body present within the chest cavity such as a piece of rubber tubing which has slipped in during a change of dressings or a subdiaphragmatic abscess may be present   The cause whatever it is must be sought and removed   If there is improper drainage our tube has not been inserted properly   If there is osteomyelitis of the rib the diseased bone should be removed   If the plastic exudate prevents the lung from expanding we must remove it and then by the institution of a negative pressure obliterate the cavity   It is said by some surgeons that chronic empyema never requires resection of the ribs and collapse of the wall   To my mind this is just another one of those universal beliefs that should be avoided   I believe that 9 out of 10 of the chronic cases can be cured by removing the cause of the long continued suppuration sterilizing the cavity and drawing the lung out to the chest wall but once in a while there is some reason why this cannot be done most commonly because of the formation of a thick non yielding wall of fibrous tissue over the visceral pleura developed during the months when the disease process was allowed to continue with no attempt to establish a negative pressure and draw the lung out to the normal position

In this particular case we have conscientiously attempted to obliterate the cavity by the less radical methods at our disposal and have failed to do so   We have been able for a number of weeks to keep the cavity surgically sterile as shown by the fact that there have been no bacteria present in the smears of the aspirated fluid but we have not been able to reduce the size of the cavity   Therefore we must resort to some other method of treatment

There are a number of surgical methods which have been devised for obliterating a cavity in the chest   One method is that devised by Schede which consists in the removal of a considerable number of ribs which permits the chest wall to collapse and the parietal pleura to fall against the visceral pleura   Other surgeons have transplanted muscle skin or pedicled flaps into the pleural cavity   Robinson in particular has presented some excellent contributions upon this subject   The operation we will perform today consists of a combination

cavity and the under surface of the patch which lies flat against
the chest wall is cemented to the skin by ordinary rubber cement
The patch should be removed and resterilized after five or six
days so that no irritation of the skin may occur underneath it

For the introduction of Dakin's solution a small tube is
passed into the pleural cavity through the larger tube Our
method of procedure is to shut off the suction apparatus by a
clamp introduce Dakin's fluid through the smaller tube and after
a fifteen minute interval start the suction again The small
tube is always clamped off except at the moment the Dakin
fluid is being introduced In this way the negative pressure is
constantly maintained and the cavity is bathed with Dakin's
fluid for fifteen minutes of every two hours Even that brief
period probably exceeds the length of time for which the solution
retains its effectiveness under ordinary conditions

In chronic cases with marked thickening of the parietal and
visceral pleura it is advisable to use a 2 per cent solution of
Dakin's fluid instead of the 0 5 per cent solution ordinarily
used If continued for three or four days this procedure will
help to destroy even a firm fibrous wall of inflammatory tissue
Obviously great care must be used to prevent irritation of the
skin of the chest wall at the site of drainage

If complete sterilization can be secured and maintained it is
permissible in certain cases to dissect out the fistulous tract and
close the thoracic opening In a fair proportion of cases this
procedure will be followed by healing without further complica-
tions

There is a certain group of cases in which in spite of the in-
stitution of a negative pressure within the pleural cavity the
lung cannot be brought out to the chest wall This fact is due to
the presence of one or more complicating factors first there
may be a non-collapsible cavity due to the long duration of the
process second there may be imperfect drainage third there
may be a tuberculous process in the pleura fourth there may be

Fig 165—Operation for obliteration of empyema cavity. Incising the periosteum of the ribs

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of the operations of Schede Robinson and Ransohoff, in that
we will resect the ribs, permit the collapse of the parietal pleura
transplant a flap of muscle and make cross sections of the sur
faces of the visceral pleura as suggested by Ransohoff

OPERATION

The patient should ordinarily be operated upon under local
anesthesia. Schumacher makes an injection of the nerves at the
angle of the rib while Kappis of the Kiel Clinic injects the nerve
at the point of emergence from the spinal column A combina
tion of these methods has been used in the present case A
U-shaped incision is made through the skin fascia and attached
muscles from the lower border of the pectoralis major in the
midclavicular line down to the eighth rib and upward along the
vertebral border of the scapula By blunt dissection this entire
mass is detached from the chest wall and raised upward (Fig
165) The bleeding points are healed The periosteum of each
rib is incised and separated from the rib with a periosteal elevator
Beginning at the lower part of the uncovered area the seventh
rib is cut at the costochondral junction lifted up and broken
off as far back as possible (Fig 166) This is an essential part
of the technic for the rib breaks much farther back than it can
be cut with a bone-cutting forceps. With a finger in the cavity
we now outline its interior to determine how far anteriorly the
other rib should be cut, since it is essential that the ribs should
be cut anteriorly and broken posteriorly beyond the margin of
the cavity, otherwise a shelving edge will be left that will prevent
collapse of the parietal pleura. We now remove the eighth and
ninth ribs and the sixth fifth fourth and third successively
We then make a vertical incision through the parietal pleura
over the middle of the uncovered area and expose widely the
interior of the cavity At the upper end of the cavity we find
a small fistulous opening leading to a bronchus It is necessary
that this should be obliterated in some way or the discharge will
continue This we do by dissecting out the fistula with a scalpel
and thoroughly cureting it where it cannot be reached by dis
section.

Fig 165—Operation for obliteration of empyema cavity   Incising the
periosteum of the ribs

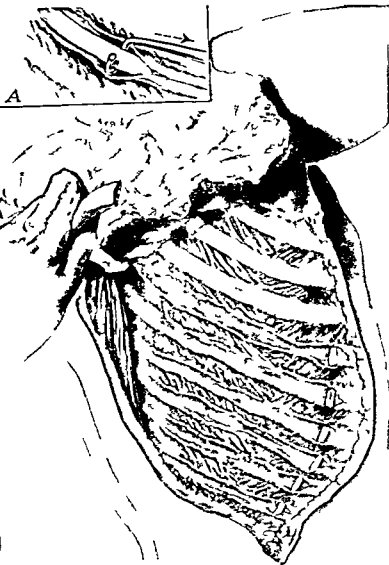Fig 166 —Operation for obli era on of emp rema cav ty Subperiosteal
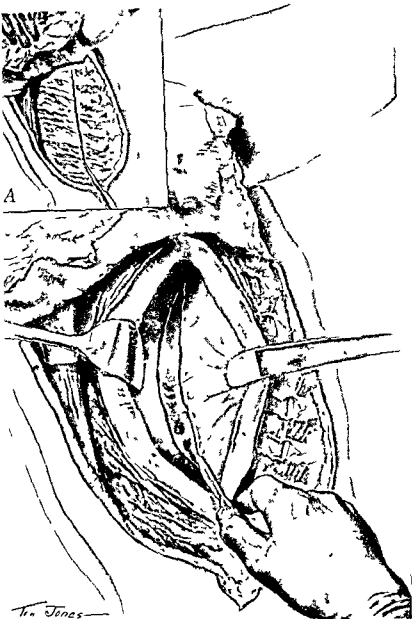resection of the ribs overly ng the ca ty

Fig 167—Operation for obliteration of empyema cavity Removal of V shaped section of tissue at the posterior angle of the cavity to permit complete collapse of its walls
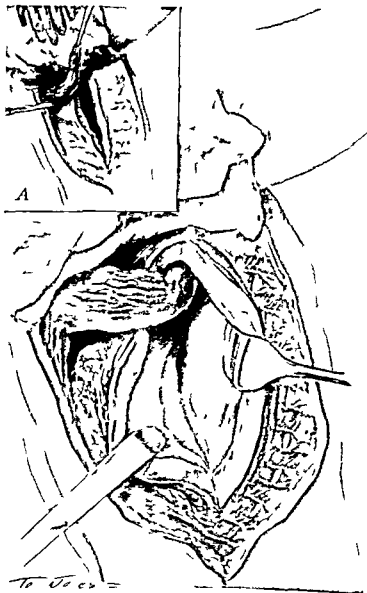
Fig 168—Operation for obliteration of empyema cavity   Transplantation
of pedicled muscle flap into pleurobronchial fistula

When now we permit the parietal pleura freed from its bony support to fall against the visceral pleura we note that at the anterior and posterior margins of the cavity where the parietal layer is reflected into the visceral layer owing to the thickness and rigidity of the fibrous wall the surfaces do not come together even under pressure It is necessary therefore to remove at these angles a V shaped section so that the walls will fall together without pressure (Fig 167) We now make cross incisions in the visceral pleura with a scalpel to favor the proliferation of fibroblasts so that there will be an early fibrous adhesion of this visceral to the parietal pleura This also permits the visceral pleura to expand more rapidly under intrapulmonary pressure A section of the latissimus dorsi is now detached at the posterior margin of the wound and a pedicled flap of muscle turned into the bronchopleural fistula (Fig 168) The bleeding points are carefully ligated A drain is inserted at the point at which we have inverted this pedicle and a second drain is inserted at the lower end of the wound The muscles and skin are sutured at their original site by interrupted silkworm gut sutures

Especial care should be used to dress the wound with pressure at the site of operation so that there will not be an accumulation of blood underneath the flap Not long ago one of my patients suffered a fatality which seemed to be directly attributable to failure to observe this precaution These patients frequently suffer from shock particularly if there has been much oozing Great care should be taken to keep them warm and quiet and to fill them with fluids If necessary one should not hesitate to give them a transfusion of whole or citrated blood They must be carefully watched for the accumulation of any fluid under neath the flap and for the development of postoperative pneumonia

AFTER HISTORY

The patient made an uneventful recovery from the operation but continued to drain thin pus from the lower end of the wound A small tube was placed in the sinus and Dakin's fluid instilled at two-hour intervals for about ten days At the end of a month

Fig 169 —Outline of chest (made from Roentgen plate) in Case II, showing
bismuth in empyema cavity before operation

Fig 170 —Outline of chest (made from Roentgen plate) in Case II showing
collapse of chest wall after operation

the wound had completely healed, the discharge had ceased,
and the patient had gained 12 pounds in weight (Figs 169, 170)

During the operation I mentioned a patient who had died following operation I wish to speak about him again for I would not like you to carry away the impression that no fatalities follow this type of operation Every surgeon meets with some fatalities and as students you should recognize the possibility of a serious outcome and the fact that the mortality ranges from 5 to 8 per cent The patient I refer to is one we operated upon some time ago

He (L V Wesley Hospital No 81206) had suffered from chronic empyema following pneumonia for over four years In spite of our efforts to cure this by the methods we have already described the empyema cavity continued to discharge thick pus He was operated upon after the method I have shown you today Following the operation owing to the fact that a tight compression bandage was not placed over the flap a large accumulation of blood took place underneath the flap This was later evacuated but the oozing had been so extensive that it was deemed advisable to do a blood transfusion After the transfusion the patient seemed to make satisfactory progress for four days when he developed a severe coughing spell with the expectoration of some sanguinopurulent fluid The following day his temperature began to rise the evidences of bronchopneumonia gradually appeared in the other lung and he died on the seventh day from an extensive bronchopneumonia The postmortem findings indicated that the involvement of the lung began with the aspiration of fluid through the open pleurobronchial fistula I believe this outcome might have been avoided had it not been for the accumulation of blood which was permitted to take place underneath the flap

The first patient whom I showed you has now been placed under our care so that we can definitely control the treatment We believe that by the aid of Perthes' apparatus we can establish a negative pressure within the pleural cavity and draw the compressed lung out to the chest wall The chest wall about the site of drainage has become raw and excoriated due to the escape of the infected secretion over the skin In fact there is a limited area of gangrene immediately about the opening in the chest
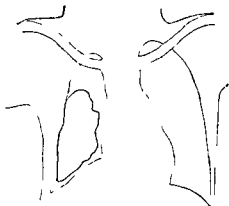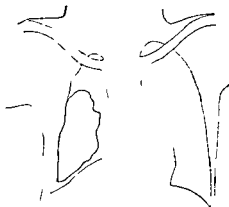
Fig 169 —Outline of chest (made from Roentgen plate) in Case II showing
bismuth in empyema cavity before operation

Fig 170 —Outline of chest (made from Roentgen plate) in Case II showing
collapse of chest wall after operation

the wound had completely healed, the discharge had ceased,
and the patient had gained 12 pounds in weight (Figs 169, 170)

large section of the latissimus dorsi with a portion of the external oblique was elevated and turned upward into the cavity   The wound was closed with the exception of a small area at the lower portion where drainage was instituted

The patient made an uneventful recovery from the operation but continued to drain pus from the wound for a number of months   To eliminate this repeated injections of bismuth paste were made which after seven months permitted the wound to heal completely

This case illustrates the fact that the method of transplanting a flap is not an adequate procedure if we cannot completely obliterate the cavity   and that in those patients in whom a small fistulous cavity persists not produced by a bronchopleural opening the injection of a paste which will obliterate the cavity and prevent an accumulation of pus will be ultimately followed by obliteration of the cavity through adhesions and the development of new granulation tissue   It cannot be expected however that all cavities treated by this method will eventually recover

For that reason we cannot apply our rubber patch at this time, but will attempt to secure an air tight closure by laying sterile gauze snugly around the tube and strapping it tightly to the chest wall

In connection with these cases I wish to present to you this patient upon whom I operated three years ago by a slightly different procedure (C B Cook County Hospital No 79459)
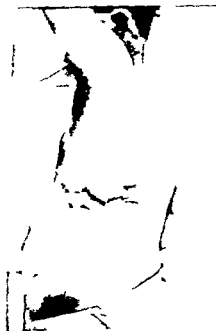
Fig 1 1—Photograph of patient (Case II) after healing had occurred

Fig 171) He had also suffered from chronic empyema in which every endeavor was made to obliterate the cavity by ordinary methods without success At operation we resected f c ribs overlying the cavity but did not uncover the cavity com as in the operation we carried out today To obliterate th ty this incision passing downward and forward was ma l a

relief as regards his rectal symptoms but did not obtain relief from his urinary distress It is a well known fact that patients with rectal disease not infrequently have urinary symptoms and doubtless many cases of indefinite or obscure rectal lesions are overlooked because of the fact that the patients' chief complaints are urinary in character and attention is directed to the urinary

Fig 172—Stone in the ureter The unusual shape and location of this stone would easily cause it to be confused with a stone in the bladder

organs These many times are negative and the patient is then sent away with a diagnosis of neurasthenia If the possibility of rectal lesions producing urinary symptoms would be more often borne in mind no doubt careful rectal examination would amply reward one for the extra time and trouble spent in hunting for lesions of the rectum The simple fact that many patients who are operated upon for hemorrhoids develop complete reten

Examination by Dr B F Davis showed the presence of two rectal fistulæ

Examination of the blood showed 22,500 leukocytes and 98 per cent hemoglobin Blood pressure was systolic 138 diastolic 85 Urinalysis shows specific gravity 1030 acid reaction no albumin or sugar, no blood microscopically a few hyaline and granular casts and leukocytes.

The patient was operated on by Dr B F Davis on September 15 1919 Two small fistulæ in the anterior wall and one in the posterior wall were dissected out and the remains of an old hemorrhoid removed

The operation gave him partial relief from his symptoms. In view of the fact that he had some pus in his urine and urinary distress it was thought advisable to have an x ray taken of the urinary tract. A culture of his urine at this time was negative Examination of the bladder urine showed the presence of 155 leukocytes per cubic millimeter Roentgen ray examination of the kidneys and ureters was practically negative for the presence of stone Examination with a plate made of the lower urinary tract showed the presence of a shadow at the right side nearly as large as a quarter The shadow was round and was situated almost in the median line (Fig 172) A tentative diagnosis of stone in the bladder was made from the x ray plate and it was then decided to verify this diagnosis with the cystoscope

Cystoscopic examination was made on September 25 1919 This failed to show the presence of stone in the bladder The left ureteral orifice was normal the right ureteral orifice was not seen In its location was seen a swelling as large as a hazelnut. The surface of this swelling was covered with mucous membrane and was smooth and glistening There were seen small vesicles on the surface of this swelling

This case is interesting from several angles In the first place the patient had a definite history of having had trouble with

fistulæ These were operated upon and the patient had some

the differential diagnosis The value of cystoscoping a stone case was very forcibly brought out in this case because, from the x ray pictures I had decided to do a litholapaxy Had I not cystoscoped the patient before the litholapaxy was to have been carried out it would have been very humiliating to introduce a lithotrite and then not be able to find and crush the stone so that we were spared this humiliation by carrying out a cystoscopic examination

With reference to the question of treatment in this case two forms will be considered first, removal of the stone by means of an operating cystoscope second open operation Because

Fig 173 —Drawing made at operation showing cystic dilatation of ureter due to presence of calculus

of our inability to see and locate the ureteral orifice and because of the rather large size of the stone we deem it advisable to do an open operation instead of resorting to the intravesical procedure usually employed in treating stone in the ureter I went over these two forms of treatment with the doctor and told him that I thought the method of choice would be a supra pubic cystotomy in order that we might be able to see better what we were doing with the bladder open rather than to resort to intravesical manipulations, especially in view of the fact that this edema had distorted the anatomy To this he agreed and this morning (9/27/19) we will attempt to remove this stone

tion of the urine should not be lost sight of. I mean to say that when a patient is operated on for hemorrhoids and retention sets in after operation such cases are very common in the first place and occurrence following operation usually in the hospital is something that cannot very well escape detection but in the rare instances in which patients have urinary symptoms due to lesions in the rectum that are not obvious the possibility of a rectal cause for the urinary symptoms is overlooked. In this type of case the differential diagnosis should include a careful examination of the rectum both by inspection with the procto-scope and by digital exploration.

The second point of interest is the presence of this shadow in the pelvis. From its size shape and position and because of its association with urinary distress one would be very apt to make a diagnosis of stone in the bladder and as a matter of fact this is the diagnosis that I made when I first looked at the plate. Not relying however upon the x ray findings alone the patient was cystoscoped. In a previous clinic on stone in the bladder its diagnosis and treatment together with the advantages of ex amining each case of stone in the bladder with the cystoscope were fully discussed. Some of the points which were brought out in that clinic bear directly on this patient and as a matter of fact though the evidence from the x ray plate seemed conclusive yet when the patient was cystoscoped no stone was found. Instead the bladder was practically normal with the exception of the changes around the right ureteral orifice. The edematous condition of a part of the bladder corresponding to the ureteral orifice was suggestive of a lesion of the right ureter. Cases of cystic dilatation of the ureter are very infrequent and the im pression was gained from the cystoscope that we were dealing with a cystic dilatation of the ureter. Occasionally there are cases recorded in the literature in which a diagnosis of cystic dilatation of the ureter has been made. However I believe that a more appropriate diagnosis in this case would not be cystic dilatation in the true sense of the word. I believe rather that the changes that we see are due to the presence of a stone and that that should be taken into consideration in discussing

METASTATIC PROSTATIC ABSCESS

Summary Diagnosis of abscess of the prostate   Rarity of metastatic abscess
Treatment—the perineal route

THE patient we have for operation this morning is Mr R
U , aged forty-eight, by occupation a milk dealer His previous
history is negative except for the fact that he had empyema
fifteen years ago Four weeks prior to entering the hospital he
developed osteomyelitis of the index finger of the right hand,
which was opened and treated with wet dressings Two weeks
later he entered the hospital with the following history

He has complete retention of urine, that is, he is unable to
empty his bladder, so that it has been necessary to catheterize
him twice a day for the past week He states that two weeks
ago he was suddenly seized with frequency of urination, so that
he was obliged to urinate ten or twelve times during the day and
five or six times at night Associated with this frequency he
also had some pain which was located in the region of the rectum
and radiated toward the base of the bladder There gradually
developed some difficulty in urinating so that the patient has
been obliged to strain more and more, until at the present time
he is unable to urinate at all One week ago he began to have
attacks of chills and fever several times a day For the past four
or five days he has had some perineal tenderness as well as a dull
pain located in the rectum

Physical examination is negative except for the presence of a
suppurating wound of the index finger

Examination of the urine, August 21, 1919, showed specific
gravity 1022, turbid, albumin, pus, and blood present

The blood examination showed 20 000 leukocytes The
Wassermann test is negative and the gonorrheal complement
test is negative

On rectal examination the prostate cannot be distinctly
outlined owing to the presence of an enormous, soft, fluctuating

The skin has been prepared in the usual manner and the bladder filled with boric solution I am making a suprapubic midline incision down to the sheath of the rectus I am dividing the sheath of the rectus and separating the muscles by blunt dissection By means of gauze dissection the prevesical fat is being removed from the bladder and with a scalpel the bladder is opened in the usual manner In the region of the right ureteral orifice is a bulging as large as the end of my thumb (Fig 173) This mass is very edematous I open into this mass and expose the stone The stone is removed and with scissors and forceps I am removing a large amount of this edematous tissue A large ureteral catheter is now passed up into the kidney without any difficulty or obstruction We are closing the bladder with continuous sutures inserting a small drain The rectus sheath is closed with continuous catgut. A small wick of iodoform gauze is placed in the space of Retzius The skin is closed with silkworm-gut and silk.

Postscript—The patient was discharged from the hospital October 11 1919 with the wound completely healed

catheter In young men with acute gonorrheal urethritis and
in whom acute retention of urine develops one should always
think of the possibility of an abscess of the prostate A careful
examination will either demonstrate the presence of or exclude
an abscess of the prostate These cases of course require
relief and it becomes necessary to catheterize in spite of the
fact that there may be present a profuse urethral discharge

Abscess of the prostate is not always as simple and easy to
diagnose as it is in this case As I mentioned previously there
may be no symptoms to direct our attention to the prostate and
hence rectal examination is not made so that many of these
abscesses are overlooked It has been difficult in some instances
to exclude benign hypertrophy of the prostate Indeed there
are cases on record in which abscesses of the prostate were
operated upon under the mistaken diagnosis of benign hyper
trophy It is easy to see just why this differentiation would
be difficult An abscess of the prostate may have one of three
possible terminations first the abscess may go on to resolution
second it may rupture Most abscesses of the prostate rupture
into the urethra or rectum occasionally into the bladder above
the bladder and suprapubic area or alongside the rectum
Doubtless many so-called ischiorectal abscesses are prostatic
abscesses which are erroneously diagnosed as ischiorectal ab
scesses Third the abscess is opened by operation In a
certain number of instances one may be able to rupture the
abscess or cause it to rupture into the urethra by means of the
finger in the rectum This may be done with or without the
presence of a sound in the urethra Cases have been reported
in which abscesses have pointed into the urethra and were
opened by fulguration Formerly some of the abscesses were
opened by an incision in the rectum in cases in which the abscess
pointed into the rectum As a rule this route for attacking an
abscess of the prostate is rarely followed As a rule these ab
scesses can be opened through the perineum in a simple way and
it is our intention to open this abscess of the prostate this morn
ing through the perineum

In view of the fact that the most prominent part of the abscess

swelling that extends as far as the inner ear wall. Renal examination is very painful. The seminal vesicles cannot be felt.

The blood picture has remained stable.

From these findings one has no hesitation at all in making a diagnosis of metastatic abscess of the prostate. Abscess of the prostate usually occurs as a complication of a gonorrheal infection of the urethra. Abscess of the prostate as a complication of gonorrheal urethritis is not of common occurrence still it does occur much more frequently than metastatic abscess of the prostate. Occasionally one sees an abscess of the prostate that is the result of a urethral stricture. Not infrequently one is able in these cases to elicit a history of rather recent urethral instrumentation, such as the passage of sounds. Metastatic abscesses of the prostate are rare. One does not find very much about them in the literature. In this case the relationship between the abscess and the presence of infection elsewhere in the body seems to be clear enough, but in order to establish the relationship it will be necessary for us to culture the secretion from the inner and also the pus from the prostatic abscess.

As a rule, little difficulty is experienced in the differential diagnosis. Patients with an abscess of the prostate complain of symptoms referable to infection. There is the presence of fever which sometimes may be as high as 104° F or 105° F. Often there is the association and history of repeated attacks or chills and fever just as occurs in this patient. In this examination this patient did not have a history of the inner, the presence of chills and fever would direct our attention to the fact that he was having some infectious process somewhere. If a patient comes in with no definite history and then develops chills and fever the prostate is not very often thought of as being the source of the chills and fever. Added to this history there frequently is a definite urinary history such as painful urination, which grew on for a few days or a week. There is not much difficulty in increase in severity and the patient experiences more and more difficulty in emptying his bladder until finally a complete retention supervenes, so that the patient must resort to the use of the

catheter In young men with acute gonorrheal urethritis and in whom acute retention of urine develops one should always think of the possibility of an abscess of the prostate A careful examination will either demonstrate the presence of or exclude an abscess of the prostate These cases of course require relief and it becomes necessary to catheterize in spite of the fact that there may be present a profuse urethral discharge

Abscess of the prostate is not always as simple and easy to diagnose as it is in this case As I mentioned previously there may be no symptoms to direct our attention to the prostate and hence rectal examination is not made so that many of these abscesses are overlooked It has been difficult in some instances to exclude benign hypertrophy of the prostate Indeed there are cases on record in which abscesses of the prostate were operated upon under the mistaken diagnosis of benign hyper trophy It is easy to see just why this differentiation would be difficult An abscess of the prostate may have one of three possible terminations first the abscess may go on to resolution second it may rupture Most abscesses of the prostate rupture into the urethra or rectum occasionally into the bladder above the bladder and suprapubic area or alongside the rectum Doubtless many so-called ischiorectal abscesses are prostatic abscesses which are erroneously diagnosed as ischiorectal abscesses Third the abscess is opened by operation In a certain number of instances one may be able to rupture the abscess or cause it to rupture into the urethra by means of the finger in the rectum This may be done with or without the presence of a sound in the urethra Cases have been reported in which abscesses have pointed into the urethra and were opened by fulguration Formerly some of the abscesses were opened by an incision in the rectum in cases in which the abscess pointed into the rectum As a rule this route for attacking an abscess of the prostate is rarely followed As a rule these abscesses can be opened through the perineum in a simple way and it is our intention to open this abscess of the prostate this morn ing through the perineum

In view of the fact that the most prominent part of the abscess

seems to be in the left side, the muscle is more in the perineum on the left side. The incision which I am employing is that usually employed in perineal prostatectomy. After incision the skin and superficial fascia, the blunt dissection is carried down to the abscess. A strong artery forceps is now introduced into the incision and made into the abscess cavity. The forceps are spread apart and we see a large amount of pus escaping. I will now explore the abscess cavity in order to break down any possible septa that much be present. Not infrequently more than one abscess is present, and unless all the abscess cavities are reached we do not accomplish our object, and the patient continues to have chills and fever and a secondary operation is necessary. After having satisfied myself that but one cavity is present, a rubber tube is placed in the cavity and a small wick or roll of gauze introduced on each side of the tube. One or two through-and-through sutures suffice to close the skin incision around the drainage-tube. Where the operation is carried out in this way it is a very simple procedure requiring a small amount of dissection and a very short anaesthesia.

After-history.—The culture of pus obtained from the finger showed the presence of streptococci. The culture made from the pus obtained from the prostatic abscess showed the presence of streptococci, staphylococci, diplococci, and a diplobacillus.

Complications of the Operation.—Injury to the rectum may occasionally occur in cases in which there is a good deal of peri-prostatitis and periproctitis. Urinary fistulae occasionally are complications of prostatic abscess.

CLINIC OF DR DAVID C STRAUS

MICHAEL REESE HOSPITAL

PERFORATED GASTRIC ULCER—DIAGNOSIS, SURGICAL MANAGEMENT, TREATMENT BY ACTUAL CAUTERY

Summary Two cases analyzed from the standpoint of the operative indica
tions   The chief points in d agnosis   Choice of procedures at operation
Type of case in which excision with the cautery is desirable   Technic
of cautery excision   Present views on gastro-enterostomy as a part of
the operation for acute gastric perforation

THE two patients I wish to present to you this morning were
both operated on by me for perforated gastric ulcer, the one the
day before and the other the day after Christmas   They are
interesting for although the perforation occurred at the usual
site in both cases—on the anterior wall of the pyloric portion of
the stomach about midway between the greater and lesser curva
ture—the clinical and anatomic findings were quite different in
the two cases and they were accordingly treated quite differently
Consideration of these two cases will help to emphasize the
importance of not following a routine method of treatment   I
wish to discuss the indications for treatment and emphasize
the necessity of early diagnosis and of immediate operation

The *first patient* L F, a man of thirty, cabinet maker by
occupation consulted Dr M L Goodkind at his office on the
afternoon of December 22d because of epigastric pain, nausea and
vomiting   The patient's appearance the marked tenderness in
his epigastrium combined with his typical gastric ulcer history,
caused Dr Goodkind to believe he ought to lose no time in get
ting to the hospital although a white blood count made at the
office was only 8000   The patient was instructed to enter the
Michael Reese Hospital at once but he did not come to the hos
pital until the following morning at 10 30 A M, when he was
admitted to the medical service

His complaints on admission were pain in the abdomen nausea and vomiting constipation, and loss of weight. The pain had been present for the past ten years, was severe, occurred about two hours after meals, and was associated with vomiting at the height of the pain, which the patient referred to as "cramps."

On admission the patient was clearly suffering from severe abdominal pain The physical examination at this time revealed nothing of importance There was no abdominal tenderness or rigidity

The temperature, pulse, and respiration on the day of admission were as follows 10 30 A M —98 6° F , 60, 18 4 P M — 99 8° F , 96, 22 8 P M —98° F , 96, 24

A blood count at noon showed 14 200 leukocytes with 85 per cent polymorphonuclear leukocytes, 11 per cent. small mononuclear leukocytes and 4 per cent large mononuclear leukocytes

A soapsuds enema was given at 7 30 P M This was followed by a constipated stool Shortly after this he vomited some dark brown fluid As he was suffering severe pain he was given camphorated tincture of opium, dram 1, at 8 and 9 P M , and a hot water bag was applied to the abdomen After this he seemed to be relieved until 11 30 P M , when he had such severe cramping pains that he got out of bed and rolled around on the floor At 10 P M his temperature was 100 2° F , pulse 80, and respirations 20 At 12 30 A M (12/24/19) his temperature was 100 9° F , pulse 100, and respirations 20, and he was still having a great deal of pain At 1 A M he vomited a small amount of brown fluid At this time the white count was 22 100

I was called to see the patient at 2 A M Examination at 2 30 A M showed that the patient was having severe colicky pains in the abdomen and was writhing with pain The lips were slightly cyanotic, pupils were equal and reacted to light and accommodation, and the pulse was 92 There was marked rigidity of the entire upper abdomen above the umbilicus This was board-like and equal on both sides There was slight rigidity of the lower abdomen also equal on both sides

There was no definite point of tenderness over the abdomen
On percussion there was a suggestion of dulness in the left
flank Percussion over the lungs anteriorly was normal In
striking contrast to this there was tympany over the liver area
anteriorly as far as the midaxillary line, in other words, ob-
literation of the liver dulness This obliteration of the liver
dulness, which is regularly described in most text books as
one of the signs to be looked for in cases of perforated viscera,
is so rarely observed that the average student gets an entirely
erroneous idea of its frequency and value In my experience
this is the first instance in which I have observed it, and it was
most striking A diagnosis of ruptured gastric ulcer was made
and the patient prepared for immediate operation He was
given morphin sulphate grain $\frac{1}{4}$, with atropin sulphate, grain
$\frac{1}{150}$ hypodermically *One should never give morphin in any
acute abdominal condition until one has satisfied himself with his
diagnosis, and then it should be given to relieve the pain and combat
the shock*

Operation—Gas-ether anesthesia was used and the operation
begun at 3 A M A midline incision was made from just below
the ensiform to the umbilicus going at once to the peritoneum,
which when exposed bulged, due to the presence of free gas
and escaped blood and gastric contents On incising the
peritoneum a large amount of escaped gastric contents, chiefly
fluid mixed with blood, presented The stomach was at once
exposed and examined and the site of the perforation quickly
found on the anterior surface near the pyloric sphincter The
perforation was of about the diameter of a 38 caliber bullet,
and was located at the center of a very pale, almost white,
sclerosed area about the size of an adult human ear, and this
entire area was as hard as cartilage, and showed some apparently
very fresh fibrin on the serosa A large amount of fluid gastric
contents which was stained with fresh blood was escaping from
this large perforation An assistant was directed to pass a
stomach tube and aspirate as much of the remaining contents
as possible While it is unwise to pass a stomach tube before
the operation has been begun, because of the danger of producing

bleeding from the ulcerated area I believe it is of considerable
value to aspirate whatever stomach contents may still be present
after the abdomen has been opened and bleeding can be con
trolled for not infrequently, as in this case when the abdomen
is open there may be considerable escape of gastric contents
This is probably to be explained by the fact that the perforation
may be temporarily or partially closed by loosely adherent
omentum or bowel which when the abdomen is opened and
the pressure conditions changed or due to manipulation in seek
ing the perforation becomes loosened and allows the free escape
of the remaining gastric contents which may be and often is
considerable Next the perforated area was well exposed and
the perforation closed using one row of interrupted through
and through black waxed silk sutures placed at right angles to
the long axis of the stomach in order to permit narrowing
This row was reinforced and buried by a row of interrupted
Lembert sutures of the same material This second row ex
tended well beyond the first at both ends The left hand was
now introduced low in the abdomen and a suprapubic stab
incision made through which a large rubber drainage tube was
inserted into the pelvis Then a blunt glass irrigating point
which was connected to a large percolator by means of a
rubber tube was introduced into the upper incision and the
entire peritoneal cavity was irrigated thoroughly with normal
saline solution placing the irrigating point first in one kidney
pouch and then in the other and giving particular attention also
to the subdiaphragmatic space Masses of undigested food
particles and mucus in considerable amounts escaped through
the suprapubic drainage-tube The irrigation was continued
until the solution returned clear Perhaps 1½ gallons were used
before the irrigation was discontinued The fluid then re
maining in the abdomen having been sponged away a rubber
drainage-tube and a Bullet drain were inserted in the upper
wound which was then closed in layers

The patient left the table in good condition He was put in
bed and the head of the bed was well raised

After history —The postoperative course was uneventful

There was no vomiting at any time The patient received nothing by mouth until the morning of December 25th After operation he was given three enemas each consisting of 6 ounces of strong coffee with $\frac{1}{2}$ ounce of brandy at four hour intervals Following this proctoclysis was given using 20 per cent brandy 3 per cent glucose and 2 per cent sodium bicarbonate in tap water allowing this to run by the drop method for periods of two hours and then discontinuing for two hours and repeating This was continued until fluids were given by mouth on the morning of December 25th when water and tea were begun in 1 ounce doses and repeated every half hour Gelatin and broth were begun on December 31st On January 8th he was put on a soft diet consisting of cereals eggs toast and custard

The large rubber drainage-tube was removed on the morning of December 25th The Bullet drain was removed on the 27th and a small guttapercha drain inserted in its place and the supra pubic drain was shortened 1 inch On the 28th it was removed entirely and substituted by a guttapercha drain On the 29th both guttapercha drains were permanently removed

No medication was given except a hypodermic of morphin sulphate grain $\frac{1}{6}$ with atropin sulphate grain $\frac{1}{120}$ at 1 30 A M December 25th and $\frac{1}{6}$ gram of morphin at 12 30 A M December 26th He was discharged on January 19th

The *second patient* W J a white male aged thirty three married was brought into the hospital at 5 P M December 26th in a police ambulance He was suffering with severe abdominal cramps which he said began suddenly about 3 o clock in the afternoon while he was driving his wagon The pain became rapidly worse but he was able to get down from his wagon and go into a store where he was found by the police

He stated that he had been perfectly well so far as he knew and that this attack of pain came on without warning Further questioning however revealed that he had had indigestion since October 1918 with pain coming on about two hours after meals associated with sour eructations and the belching of gas but that he had not paid much attention to these symptoms He never went to a physician for this indigestion but he found that

the pain and discomfort were relieved by taking food or sodium bicarbonate He never vomited or noticed any dark stools The pain was most severe about 2 P M It never awakened him at night and was never severe enough to cause him to go to bed He had been absolutely free from any pain or discomfort for the last month or so He gave no history of having had pain in the right iliac fossa at any time His bowels had always been fairly regular and urinations normal He ate and slept well

About one and a half months ago he had influenza and at this time coughed a great deal He has coughed more or less ever since He had no cough previous to the attack of influenza not did he have any abdominal trouble during the attack His past history was negative except for the indigestion which began in October 1918 He gave a history of Neisserian infection but denied ever having had a chancre When a young man he drank heavily of alcohol but had abstained completely for the last three years

I saw the patient at 5 15 P M The following are the more important facts of the physical findings dictated by me at that time

The patient appears to be in great pain His lips and nails are cyanotic and extremities are cold He appears to be in a moderate degree of shock

'Head and neck are negative Pupils are equal and react normally to light and accommodation The lungs show the presence of a few crepitant râles over the left lower lobe posteriorly, the lung findings otherwise are normal The heart is normal pulse is regular weak and the rate is 64

Examination of the abdomen shows no obliteration of the liver dulness The upper border of the liver is at the sixth rib in the nipple line at the eighth rib in the axillary line and at the tenth rib in the scapular line The abdomen is scaphoid There is marked rigidity particularly in the upper half and this is equal on both sides The recti muscles stand out prominently There is considerable rigidity over the lower abdomen with tenderness on both right and left sides but slightly more marked on the right side There is a definite point of maximum tender

ness about two fingerbreadths directly above the umbilicus
Palpation of the liver is difficult because of the rigidity but
percussion shows the lower border of liver dulness to be two
fingerbreadths below the right costal margin   There is appar
ently some shifting dulness in the right flank which changes with
the position of the patient but it is difficult to be certain of this
because of the marked rigidity of the abdominal wall   A
diagnosis of perforated gastric ulcer was made and immediate
operation arranged for

At 5 45 P M his temperature was 97 6° F , pulse 76, and
respiration 16

As soon as the diagnosis was made the patient was given a
hypodermic injection of morphin sulphate grain $\frac{1}{4}$ with atropin
sulphate grain $\frac{1}{130}$

Blood count made at 6 40 P M showed 26 000 leukocytes
Urine examination was normal

Operation —Gas ether anesthesia was begun at 6 45 P M
A midline incision was made from just below the ensiform to the
umbilicus   On opening the peritoneum no fluid was encountered
The stomach was at once exposed and an area of fibrin indicated
the region of the perforation on the anterior surface near the
pylorus   Before inspecting this area the gall bladder which
was easily exposed by retracting the wound edges was examined
and was found to be distended but normal   The transverse
colon and omentum were then drawn out through the incision
and the area about the pylorus was carefully and thoroughly
packed off from the general peritoneal cavity using three hot
wet sponges   The perforation was now examined and found to
be a pin point perforation (Fig 174 1) located about midway
between the greater and lesser curvature on the anterior surface
of the pyloric portion of the stomach about 2 inches from the
pyloric sphincter   A very small amount of fluid gastric contents
was slowly escaping and a very little was free in the abdomen
This was carefully sponged away and an assistant was directed
to pump out the stomach by means of a stomach tube and aspira
tor   The stomach being emptied (fresh red blood came away
with the gastric contents) the perforated area was examined
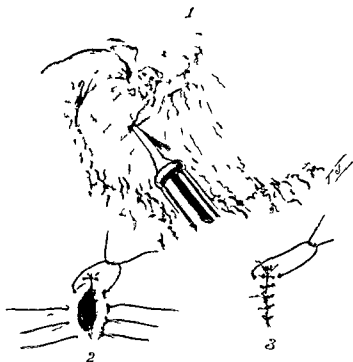
Fig 1 4 —1 Method of cautery excision of a perforated gastric ulcer at
the usual site of perforation the cautery is passed through the perforation
and the ulcer burned away peripherally   2 First row of sutures inserted to

There was a wide area of induration perhaps an inch wide all about the perforation easily palpable through the stomach wall by the hand introduced behind the stomach The ulcer was excised with an electric cautery introducing the cautery point through the perforation and thoroughly cauterizing its edges (Fig 174 1) The larger opening thus produced was closed by means of four interrupted through and through sutures of black waxed silk (Fig 174 2) placed at right angles to the long axis of the stomach to prevent narrowing and buried and reinforced by a layer of Lembert sutures (Fig 174 3) as in the previous case The closure was further strengthened by sewing a pedunculated flap of omentum over the line of sutures A cigarette drain was introduced down to the site of the perforation and the abdomen then closed in layers The drain was allowed to come out at the lower angle of the wound

The patient left the table in excellent condition.

After history—When the patient was returned to bed his pulse was 84 and of good quality The details of the after treatment were similar to that employed in the first case Fluids except milk were begun by mouth on the morning of the 28th and continued until January 1st when broth and gelatin were added to the diet On the 4th soup and custard were added and light soft diet was begun on the 7th

On December 27th the day following operation the temperature ranged from 99° to 100 4° F the pulse from 72 to 88 and his condition seemed excellent except that in the evening he was bothered by some mucus in the larger bronchi On the 28th he was somewhat cyanotic and complained of considerable mucus which he could not raise The temperature on this day rose to 101° F by evening though his pulse remained between 76 and 82 and respirations 20 to 24 On the morning of the 29th the patient was still cyanotic and still troubled with mucus The drain was removed permanently The abdomen was soft and not tender His temperature which was 100° F in the morning rose to 102 6° F at 4 P M At 8 P M it was 103° F and by midnight reached 104 4° F His pulse rate varied between 92 and 108 Respirations which had remained at 20

during the day, rose to 32 by midnight On December 30th
examination showed the abdomen everywhere soft and no area
of tenderness   There was some slight distention but no dulness
in the flanks   The upper border of liver dulness was normal
The patient was still very cyanotic, troubled with considerable
mucus and there was roughened breathing over the right side
of the chest especially posteriorly and laterally over the lower
right lobe   His condition suggested more a central pneumonia
than an abdominal case   The temperature varied between 102°
and 104° F , pulse between 100 and 124, and respirations between
24 and 28

When seen the next morning, December 31st his condition
seemed about the same and the findings were practically the same
as on the previous day   By 4 P M his temperature had risen
to 105° F   At this time his pulse was 100 and respirations 24
I deemed it advisable to examine the patient radiologically in
order to rule out the possibility of a subphrenic abscess   He
was therefore taken to the x ray room at 4 30 P M and fluoro-
scoped on the table   Cloudiness was seen in the middle of the
right lower lobe   The diaphragm on the right side moved very
little, but this is what one would expect from the amount of
pathology in the right lower lobe   There was no fluid in either
pleural cavity   A roentgenogram (Fig 175) was taken which
showed patches of cloudiness in the right lung extending from
the second rib to the diaphragm   It was impossible to tell from
the plate whether or not there was any subphrenic involvement
A diagnosis of bronchopneumonia was made   The relatively
low pulse and respiration as compared to the fever suggested a
subphrenic abscess, although the extreme height of the tempera
ture made me believe that the patient was suffering from pneu
monia as I recorded the day before   Blood count showed 24 400
leukocytes

The next day, January 1st, he began expectorating a large
amount of mucopurulent sputum   His general condition seemed

24 to 20 From this date he made a progressive recovery All stitches were removed on January 5th He was up in a wheel

Fig 175—Roentgenogram of Case II taken December 31, 1919, five days after the operation This reveals patches of cloudiness in the right lung extending from the second rib down to the diaphragm There is no fluid in either pleural cavity The diaphragm appears normal on both sides There is evidence of subphrenic abscess The findings corroborate the clinical diagnosis made previously of postoperative bronchial pneumonia Note the enlargement of the right heart to the right (compare with Fig 176)

chair on January 11th, walking around on the 14th, and was discharged on the 20th

Roentgenologic examination made the day before he left

the hospital to determine the condition of the right lung is a

19th the day before
s that the bronchial
rch cleared except
This is probably
in a large part due to peribronch al thicker g the result of the recent pneu
he l f lung al o more m d h m l

matter of interest   The roentgenogram (Fig 176) shows the lung
to be entirely clear, except that the bronchial tree is much more

pronounced than normal probably the result of slight peri bronchial infiltration the only remains of the recent bronchial pneumonia   Comparison of this plate with the one taken while the bronchopneumonia was present shows an interesting differ ence in the heart findings at these two times   You will note that the right border of the right heart is considerably further to the right when the pneumonia was present than after the pneumonia had subsided   This is of course what one so often sees during the course of pneumonia—enlargement of the right heart due to the increased work thrown upon it   The marked difference of the right heart seen in the two plates may be in part due to a difference in the point of focus and focal distance when the two exposures were made

These two cases both seen comparatively early and both perforated at the usual site—on the anterior surface near the pylorus—presented quite different findings both as regards the size of the perforation and the amount of escaped gastric con tents   They were therefore treated quite differently, and with recovery in both cases   It may be of interest to consider the management of these cases and in particular to consider the merits of the various methods of treatment   for there is a con siderable difference of opinion among surgeons as to the value and even propriety of certain procedures that are in general use today   But before entering upon a discussion of treatment let us briefly review some points in the diagnosis

DIAGNOSIS

The *diagnosis* in cases seen early is usually easy   The patient appears very ill   is often in a moderate degree of shock is suffering with agonizing epigastric pain   which as a rule begins suddenly as a sharp stabbing pain   often associated with or followed by vomiting   The initial vomiting may or may not be repeated   The vomitus often contains blood   Where this is present it is of considerable diagnostic aid   Careful questioning will often elicit the typical history of a gastric ulcer as was *given by the first of these two patients*   Frequently there may be merely a history of previous indigestion as in the second case

Less often but by no means rarely, there may be no history of any antecedent gastric disturbance, and the perforation may have come on without warning as the first symptom of an absolutely latent gastric ulcer   Or again, as in the second of these two cases, although the patient may have been troubled with indigestion over long periods in the past, there may have been an entire absence of indigestion for a long time immediately before the perforation occurred and the perforation strikes the patient down when he feels and believes he is perfectly well   This brings up the question of premonitory symptoms   Are there any symptoms or signs that warn of a threatening per foration?   There are no symptoms that are characteristic of a threatening perforation, though there are several which if present, are suggestive   The indigestion is frequently worse just before perforation occurs and there is often an increase in the epigastric pain and tenderness   However, many cases, as the one just referred to, give no prodromal symptoms whatever   The other case the one that was seen by Dr Goodkind the day before perforation occurred impressed him as being in such serious condition that he advised the patient to go to the hospital at once, and this was thirty six hours before the perforation occurred   It is most instructive and interesting that a blood count taken at that time showed a leukocyte count of only 8000

Examination of a patient seen soon after the perforation has occurred shows such a board like rigidity of the abdomen as is seen in few other conditions   The rigidity is more marked in the upper than in the lower abdomen and is about equal on both sides   The entire abdomen above the umbilicus is as near board like as it is possible for muscle rigidity to be   In cases seen early this is typical   Mayo has pointed out however, that it is not always present as some few people have an insensitive parietal peritoneum and in these rigidity may be absent.   But such is decidedly the exception and only goes to prove the rule   If one sees the patient at this early time soon after the perforation has occurred he will not need to call upon a colleague to corroborate the finding of rigidity   No layman could miss it.   Usually in from two to three hours after

the perforation has occurred there is a period during which all the symptoms abate The rigidity is no very much less marked and the patient looks and feels better the pain is less severe though it has not entirely disappeared If the physician sees the patient for the first time during this stage he may easily overlook the serious nature of the case and unless he has obtained an accurate history could easily fail to make a proper diagnosis A careful history is the most important means of making the correct diagnosis in a case seen at this stage The rigidity may be so much less than it was earlier that the physician may want a colleague to corroborate his finding of rigidity But it is usually there Up to this time there is usually a point of maximum tenderness and this as a rule corresponds closely to the area of maximum pain This is usually in the epigastrium either directly above the umbilicus or a little to the left of the midline The temperature and pulse at this time are usually about normal If there is much shock the temperature may be slightly subnormal The pulse may be slightly increased in rate but this is minimal as a rule The leukocyte count however is definitely increased and is somewhere about 12 000 to 14 000 As time passes the pulse rate and leukocyte count progressively increase The first case was very instructive in this regard The leukocyte count the day before perforation was 8000 The evening that perforation occurred it rose to 14 000 and just before operation, about six hours after perforation occurred it had risen to 22 000 It does not always reach this height

In cases seen after a longer time has elapsed the picture changes The patient seems to become sicker again Peritonitis has commenced Cases seen at this time are most frequently mistaken for cases of appendicitis This is due to the fact that the escaped gastric contents gravitate toward the right iliac fossa guided there by the attachment of the mesentery or by the ascending colon The pain and tenderness as well as the rigidity are now most marked over the region of the appendix Every surgeon of any considerable experience has seen cases operated upon under this mistaken diagnosis Fortunately I have never made this unpleasant mistake But where a case

has been brought to the hospital late, and the well meaning but
unwise physician who saw the case early has given the patient
a dose of morphin to relieve the patient's suffering without making a proper diagnosis, a surgeon can be excused for opening
the abdomen under this erroneous diagnosis And even when
the case has been seen by the surgeon from the onset it is not
always possible to be sure of his diagnosis and in such a case he
performs a purely exploratory laparotomy believing that he is
dealing with a surgical abdomen It is not always possible to
tell whether he is dealing with a ruptured gall bladder, an acute
pancreatitis etc, but it is better judgment to make an early
small exploratory incision to determine the diagnosis than to
wait to make a more positive diagnosis and in the meantime
have the patient lose his best chance of recovery In this connection it is of interest to point out that one may find rare
cases of influenza in which there is just as sudden severe abdominal pain and just as marked epigastric rigidity as one finds
in a case of perforated gastric ulcer and I have recently seen
such a case The one diagnostic differential point, however
is that in influenza instead of a definite leukocytosis one ordinarily finds a leukopenia

Cases of perforated gastric ulcer that are seen late say after
the first twelve hours present the usual picture of general
peritonitis and at this time except for a good history it is often
impossible to make an accurate diagnosis of the cause of the
peritonitis

It is clear therefore that no matter at what stage the patient
is seen the history is a most valuable if not *the* most valuable
element in arriving at a correct diagnosis but as the patient's
chances of recovery are in inverse ratio to the time that has
elapsed it is most important to operate early

SURGICAL MANAGEMENT

The aim of the surgical management should be to perform a
simple rapid operation to close the perforation and free the
peritoneal cavity of the escaped gastric contents with the minimum operative risk Where the continuance of a local patho-

logic condition can be dealt with or future complications prevented by a minor additional procedure this may be added but no complicated procedure should be considered which prolongs the time of the operation

Anesthetic—A general ether anesthesia should be employed as a rule   When however a case is seen late the operation is at times well conducted under local anesthesia with perhaps the addition when needed of gas oxygen general anesthesia

Incision—As the great majority of perforated gastric and duodenal ulcers lie close to one or the other side of the pyloric vein and as the other conditions from which a perforated gastric ulcer has to be differentiated can also be reached through a suitable incision which is often in the nature of an exploratory one I prefer to open the abdomen by a midline incision beginning above just below the xiphoid cartilage and continuing downward to the umbilicus or curving slightly to the left of this and continuing to a little below this level   It is desirable to have ample exposure so that the perforation can be easily dealt with and the operation can be rapidly completed

The perforation is usually easily found by the presence about it of fresh fibrin and stomach contents can often be seen escaping through the opening   At times it is difficult to locate the perforation   In such a case pressure on the stomach usually causes some air or fluid to escape and this aids in locating the perforation   To aid in locating the perforation Baker[1] has suggested that in cases in which an acute perforating gastric or duodenal ulcer is suspected the patient be given by mouth 3 grains of methylene-blue dissolved in an ounce of water   On opening the abdomen the site of perforation is plainly made out by the blue color of the serosa   The method has proved of definite value and can be recommended   After a perforation has been found one must not neglect to search for a second one which occasionally is present

Closure of the Perforation—It has of late been taught that a perforated gastric ulcer is a cured ulcer   For this reason it has become the accepted practice merely to close the perforation

[1] Surg Gyn and Obst 1917 25 695 1920 30 93 94

This is most often done by means of two superimposed purse-string sutures—the first closing the opening and the second burying and reinforcing the first suture Excision of the edges of the perforated area has in general been given up of late the belief being that excision is both unnecessary and undesirable The recent statistics of Gibson[1] would seem strong substantiation of this belief

Excision of the margins of the perforation has been suggested for two reasons first to insure cure of the ulcer and second to free the stomach of any latent carcinoma that may be present in the margins of the ulcer crater

As far as cure of the ulcer is concerned it seems rather well established that perforation usually does result in cure When the perforation is large and the entire floor of the ulcer has cut itself away in an old sclerosed ulcer this would seem more logical and easier to understand than in case of a pin point perforation in a rather recent ulcer In the latter case it is more difficult to feel convinced that this minute perforation will result in cure especially where the minute perforation is surrounded by a wide zone of induration as was found in the second case

While I do not believe it would be necessary to resort to cautery excision in the former type of case in order to insure cure of the ulcer and this was not resorted to in the first case for this reason I do believe that cautery excision may be desirable in treating these pin point perforations surrounded by a rather extensive area of induration

The cauterization not only accomplishes sterilization of the infected area (if one agrees with Rosenow's theory) but also carries with it a rapid simple and effective means of destroying and guarding against the development of carcinoma as has been taught and practised by Balfour in the treatment of simple gastric ulcers chronic perforated gastric ulcers and those threatening to perforate where perforation has progressed to just below the serosa

The great frequency with which carcinoma is being found microscopically in cases which clinically and macroscopically

[1] Surg. Gyn and Obst. vol xxii April 1916 p 588

are diagnosed as simple callous ulcers demands consideration
This has been pointed out and emphasized for years by the Mayo
clinic

Wilensky and Thalheimer [1] in an investigation to determine
the etiologic relationship of benign ulcers to carcinoma of the
stomach failed to find absolute proof that carcinoma can arise
in a pre-existing ulcer From their own study and from the
results reported by others they believe it is fair to presume that
in a very small percentage (1 to 2 per cent) carcinoma has arisen
in an ulcer that the majority of ulcerated gastric lesions are
either simple chronic ulcers or definite carcinomas from the
onset The most important fact they pointed out however is that
*of the 48 ulcerated gastric lesions they studied all of which
appeared benign grossly 18 7 per cent were proved by the
microscope to be malignant* Küttner [2] found the same in 43 per
cent of his series and Payr [3] has found it in about 26 per cent
Demmer [4] taking into consideration these high percentages of
carcinoma in apparently simple ulcers concludes that the area of
perforation should be excised as a routine While one would
hesitate to urge the routine excision as desirable to insure cure of
the ulcer especially in view of Gibson s statistics nevertheless the
constantly increasing statistics showing the frequency with which
carcinoma is being found in what are clinically apparently simple
callous ulcers is a strong argument in favor of routine excision
and in particular for cautery excision However except in the
hands of skilled surgeons I believe it would be dangerous to
advocate the general use of cautery excision in the treatment of
acutely perforated gastric ulcers and statistics alone will deter
mine the wisdom of resorting to cautery excision as the routine
treatment of these cases even in the hands of skilled surgeons [5]

Demmer advocates that in addition to routine excision of the
ulcer gastro enterostomy should in every case be added with

[1] Annals Surg vol 67 1918 p 215
[2] Arch f kln Chir Bd 93   [3] Ibd Bd 93
[4] Be träge zur kl n Chirurgie 1918 Bd cxı 2 400–438
[5] Since this clinic was held and reported for publication Kirkland (The
Lancet vol 198 No 1 p 26) has reported 3 cases successfully treated by
this method and he s a strong advocate of th s method.

the idea of not only temporarily relieving the suture line where the ulcer closure has been made but also of insuring permanent cure of the underlying causal pathology

The question as to whether or not a gastro-enterostomy should be performed as more or less of a routine in cases of perforated gastric ulcer is under active discussion and there is still a marked difference of opinion The routine performance of a gastro-enterostomy was strongly advocated by Deaver[1] in this country several years ago but it has not found general favor Richter[2] of this city, however, has recently argued in favor of the routine performance of gastro-enterostomy in these cases Gibson admits ' it may rarely be indicated to forestall stenosis " He rejects it as a curative in this class of cases, for he believes it is unwise to do a gastro-enterostomy for a condition which is going to be cured anyhow ' In the very small percentage of cases in which a gastro-enterostomy may possibly later become necessary he wisely postpones that operation until its indications are clearly recognizable His mortality statistics and results would seem to bear out his argument

Eliot[3] is of essentially the same belief Bevan[4] believes there is ' no logical reason in the world for combining gastro-enterostomy in the operative treatment of these perforations unless there is definite evidence of pyloric obstruction and points out the greatly added risk of performing a gastro-enterostomy under these most unfavorable conditions

Contrary to this consensus of opinion among the more prominent American surgeons against the routine use of gastro-enterostomy in the treatment of these cases it is interesting to learn from the most recent German journals that many German surgeons are coming to use gastro-enterostomy as a routine in these cases Demmer not only comes out strongly for it himself, but states that in the University Clinic at Frankfort of which Dr L Rehn is director, in addition to the local care of the

[1] Trans. Phila Acad Surg 1914
[2] Surg Gyn and Obst , vol xxvii , April 1919 p 399
[3] Amer Jour Surg October 1908
[4] Surg Gyn and Obst vol xxii April 1916 p 499

perforation gastro enterostomy has seemed to become more and more necessary and is now done wherever possible Rosenthal[1] in a very recent article, similarly comes out strongly in favor of gastro enterostomy in the treatment of perforated gastric ulcer, and states that it should be added whenever possible His article is also of interest in that he points out the very striking recent increase in frequency of perforated gastric ulcer in Germany In the city hospital of Darmstadt, in which he is on service, there is an average of 5000 new admissions yearly In this hospital during the ten years previous to 1918, there were only 14 cases of acute perforated gastric ulcer In striking contrast to this, there were 10 cases in the six months ending at the time Rosenthal made his report in 1918 He attributes this striking increase in frequency largely to the carbohydrate diet and the stress and strain due to the war Noetzel[2] similarly advocates gastro-enterostomy as a routine in perforated gastric ulcer in all cases except when the vital condition of the patient demands that the operation be rapidly completed

At present I believe that, in view of our American statistics the following conditions if present, might justify the perform ance of a gastro enterostomy

(a) One might consider performing it in cases in which there is definite evidence of pyloric obstruction However, there is no doubt that many of these patients can be tided along on liquid diet until after they have recovered from the dangers of their perforation, and I feel that an operation to relieve this had better be postponed as a rule even though it might be necessary to perform the second operation within a few weeks

(b) Cases in which the ulcer is located very close to the pylorus and is of such large size that any operative closure would result in pyloric obstruction I believe would justify a gastro enterostomy, and I can imagine that this might be the method of choice though I have not seen such a case

(c) In case of very large perforations, which cannot be closed by any suture method and which in the past have been treated

[1] Beiträge zur klin Chirurge 1918 Bd cx Hft 3, s 558
[2] Ibid s 580

by sewing omentum over the large opening covering it by means of a fascial transplant, or closing it by tamponade, or treating it by inserting a large rubber drainage-tube through the opening (Hochenegg) I believe might in some cases be well handled by means of gastro-enterostomy thus by the same operation establishing a gastro-enterostomy and effecting a closure of the perforation Personally I have never seen so large a perforation but if I should ever be so unfortunate as to encounter one I believe I might deal with it in this manner

Treatment of Escaped Gastric Contents —When the amount of escaped gastric contents is small or even moderate in amount but is well limited it is probably best treated by gently sponging it away If however the amount is large and contains gross food particles I believe sponging is indicated for it is impossible to sponge away gross food particles and these should not be left in the peritoneal cavity Irrigation alone can be relied upon to free the peritoneal cavity of such gross soiling but it must be clearly appreciated that the irrigation cannot effect sterilization of the peritoneum that has been so soiled However, it so di

with the first case If it is deemed essential to irrigate the perforation should be closed and then a counteropening made a stab incision above the symphysis and through this a large rubber drainage-tube is introduced well down into the pelvis Then irrigation should be carried out through the upper incision allowing hot normal salt solution at a temperature of 108° to 110° F to flow in above and escape below through the suprapubic drainage-tube It is essential to use a large amount of salt solution—even gallons The irrigation should be continued until no more food particles escape and the fluid returns clear

Drainage —Although the tendency in abdominal surgery today is to drain less than in the past and some surgeons as

Gibson have done away with drainage in these cases I personally prefer to leave in a small guttapercha drain in cases in which there has been a limited amount of extravasation I remove the

Fig 177 —Roentgenogram of stomach in Case I filled with an opaque barium meal Th s shows that the stomach is orthoton c and normal in loca t on Two perstalt c waves are seen wh ch on fluoroscop c exam nation were seen to travel from the card a do n to the pylorus The antrum cuts off well and s rounded n outl ne The bulbus does not show well although the duodenum perm ts of rap d empty ng of the stomach wh ch was complete before the end of five hours Th ere s no narrow ng as a result of the closure of the perforat on

drain at the end of thirty six to forty eight hours if there then seems no indication to leave it in longer When however there has been gross extravasation so that it has seemed wise to irri

gate I prefer to leave a drain both in the upper wound and in the suprapubic stab incision as I did in the first case

I do not wish to go into the subject of after care

Fig 178—Roentgenogram of stomach in Case II filled with an opaque barium meal taken February 18 1920 The stomach appears as a normal orthotonic type coming down just below the crest No gastric pathology is noted The peristalsis is good and the antrum cuts off well There is no evidence at this time of the perforated gastric ulcer and no narrowing as a result of the operation The stomach was completely emptied before the end of five hours

In closing I believe it may be of interest to say a few words in regard to the gastric condition in these two patients at the time they were last examined February 18 1920

Both patients showed stomachs of normal contour and with an emptying time of less than three hours (Figs 177 178) When seen three hours after having had the first of a double barium meal, the stomach was entirely empty in each case Furthermore neither patient has had the slightest pain since the time of the operation It may be recalled that the first patient had had severe pains daily for the previous ten years Neither patient has vomited since he returned from the operating room Both patients have recently been given an Ewald test meal and the gastric contents examined at the end of forty five minutes The first patient showed 90 c c of coffee colored fluid (cautery excision was not done in th

89 The seco

undigested fo

both patients show higher acid values than normal they are at present being kept on a mildly restricted gastric ulcer diet

In conclusion without wishing to go into the subject of postoperative treatment I may add that I believe it is important as part of the after care to give these patients the benefit of ulcer management

CLINIC OF DR ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

REPAIR OF THE COMMON BILE DUCT

Summary Cholemia resulting from operative injury of the common duct—technic of operative treatment Method of locating upper and lower ends of duct at point of stricture The T tube and the results expected from its use in the ideal case—frequent disappointments Importance of preventing injury to common duct emphasized by the difficulty of subsequent repair of such injuries cholecystectomy—with the operator on the left side of the patient—a point in technic

THE patient I shall operate upon this morning is one of a half dozen similar cases that we have had to deal with in the last year The patient is a woman of fifty two who was operated upon seven or eight months ago for gall stone disease The operating surgeon removed the gall bladder, which was indurated and contracted and contained a number of large stones The description which I have obtained of the operation is that there were a good many adhesions and that the operation was difficult The man who operated is a man of large experience and one of our oldest and best known surgeons The patient made a fairly good recovery from the operation, but she drained bile for a good many weeks afterward through a small fistula at the site of the drainage-tube This, however eventually closed While she was draining bile she was quite comfortable and her general condition was good After the fistula closed, however, she had one quite severe attack resembling her old gall stone colic attacks and this was followed by jaundice and by intense itching Since that time she has had intermittent jaundice and part of the time the stools have been clay colored and part of the time they have contained bile The itching has been a very persistent and most distressing symptom

I have had the patient under observation for several day' The clinical diagnosis which I have arrived at is injury of the common duct from the cholecystectomy operation with resulting scar and stricture, which prevents for a part of the time at least, the bile from passing into the intestine The stricture evidently, however, is not complete, because the symptoms are intermittent It may be that we shall find a stone in the common duct, although from the history of the condition it does not seem as probable to me as the existence of a stricture The coagulation time of the patient's blood is about four and one-half minutes She is weak She has lost a great deal of weight and she is exceedingly anxious to have the operation and be relieved of her trouble, especially of the intense itching

The patient is now prepared and completely etherized I am making a large S shaped incision dissecting out the scar of the original operation I fully expect to find this operation difficult as all these operations are apt to be on account of the extensive adhesions. Opening into the peritoneal cavity I find everything adherent. It is necessary for me to separate the omentum from the liver Finally I fight my way down through adhesions so that I can expose the stomach, pylorus, and first part of the duodenum I find the duodenum is plastered firmly to the liver, and this is dissected off with a great deal of difficulty, and I open into an old pocket of granulation tissue containing no pus however, at the site of an old abscess between the duodenum and the liver With a great deal of care I am able to separate the duodenum from the liver without opening into the gut I now come down to the foramen of Winslow I can introduce my finger into the foramen of Winslow and bring up into view the right free edge of the gastrohepatic omentum which contains the common duct In order to get a better exposure so that I can work to better advantage I shall move to the left side of the patient This is a point which I have emphasized repeatedly in this clinic in these difficult bile-tract operations The right free edge of the gastrohepatic omentum as I lift it out is a mass of scar tissue I cannot recognize the common duct I can feel the hepatic artery beating distinctly

at the upper part of these structures and a little to the left I cannot make out either by sight or palpation the position of the portal vein Freeing the free edge as well as I can I now
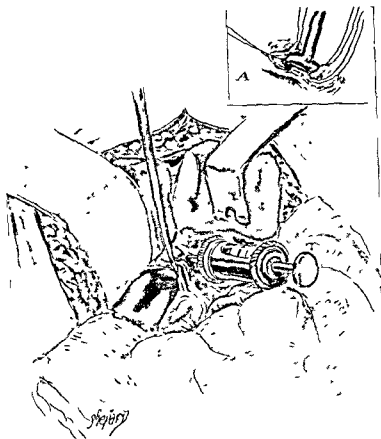

Fig 179 — Locating ends of common duct by means of aspirating syringe A T tube in place ends of ducts to be approximated as nearly as possible by catgut sutures

take a hypodermic needle and syringe and attempt to introduce the needle into the proximal end of the common duct (Fig 179) I do this because I have so frequently found that the wound

end is dilated with bile and mucus and I have frequently been able to find it in this way with a hypodermic syringe. Plunging the needle into the position where I believe the proximal end of the common duct to be and withdrawing the piston the syringe fills up at once with mucus containing some bile and what looks like small masses of pus and cholesterin. My needle therefore is in the dilated proximal end of the duct. Cutting with a knife along the needle I now open into the duct and out pours a very large amount of bile-stained mucus. Most of this material is mucus secreted from the intrahepatic bile ducts. The obstruction has been so complete and for such a great length of time that the secretion of bile has been almost suppressed. I have found this condition in a number of these cases. After opening up the proximal end of the duct I introduce a No 15 American size rubber catheter into it and allow the mucus to drain out through the catheter.

My next problem is to find the distal end of the common duct and apparently this will be more difficult. I first try to find an opening from this proximal end of the common duct into the distal end through some narrow stricture. I cannot however find any distinct opening. I therefore try to locate the distal end of the common duct using the needle and syringe. I locate the distal end by finding a cavity containing a very small amount of mucus which is drained into the barrel of the syringe. Cutting down on to this I find I have opened the distal end of the common duct beyond the stricture. There is a space intervening between the distal end which I have found and the proximal end of probably ¾ inch which seems to be almost entirely occupied by scar tissue. I take it for granted that about that much of the common duct was clamped or ligated at the time of the first operation and destroyed. There must be from the history of the case a small fistulous tract through which bile can still find its way. This however I have not been able to locate. The stricture is to all intents and purposes like an impermeable stricture of the urethra through which the surgeon has not been able to pass even a filiform bougie. I believe that we can handle this case best by a T tube one part of the T being introduced into the

proximal end and one into the distal end and the main leg of the tube brought out through the external incision and by bringing the proximal and distal ends as close together as I can with catgut suture (Fig 179) I now sew the peritoneum over the tube with some fine catgut sutures so as to be sure of maintaining it in position Then close the external incision leaving in addition to the T tube in the common duct a small cigarette drain

(The patient stood the prolonged operation very well Unfortunately like many of these cases in spite of the fact that her blood coagulated in fairly good time about four and one half minutes she had more or less continued oozing of blood for the first forty eight hours There was a very free escape of bile At the end of forty eight hours the oozing ceased the itching disappeared and she went on to a very good recovery)

From my experience with these cases I intend to leave this T tube in for eight or nine months blocking up the external opening so that the bile will pass into the intestine for a greater part of the time Then at the end of eight or nine months we shall remove the tube with the hope that a sufficient canal has been established to make a permanent communication between the proximal and distal portions of the duct At the end of that time I think we may take it for granted that this canal is lined with mucous membrane and that it will persist

These cases are becoming so common that one feels like preaching on the subject and warning the occasional or inexperienced operator of the great danger of injuring the common duct in cholecystectomy and of emphasizing again and again the importance of the technic which must be followed in cholecystectomy in order to prevent the possibility of these accidents Of course cholecystectomy should not be done by one without the necessary training and even where it is done by a well trained man he must insist that before the cystic duct is clamped or ligated it should actually be seen by the operator so as to prevent the possibility of his injuring the common duct As one of the points in technic which makes this possible I want again to call your attention to the importance of doing the final steps of

a cholecystectomy on the left side of the patient, because it is in that position that the operator can much better see just what he is doing in one of these deep wounds, and from that left sided

position it is practically always possible to see actually and separate the cystic duct from all the surrounding structures before it is clamped and ligated (Figs 180 189)

In connection with this case, which you have had the op-

portunity of seeing, I want to refer to a very unfortunate case
which I operated upon within the last few weeks A nurse,

OPERATOR ON
LEFT SIDE OF
PATIENT

Fr 191

operated on by a surgeon whom she had been accustomed to
help in the operating room, was operated on first for what was
supposed to be gall stone disease At the first operation I

understand no gall stones were found and the gall bladder was simply drained She improved somewhat but later she had a recurrence of the symptoms and an operation was done the surgeon stating that he found very extensive adhesions and that he had to remove a large amount of tissue including the gall bladder with adhesions and with a large stone This was followed some months later by jaundice which finally became persistent and complete She was brought to me for examination and I knew at once that it was a stricture of the common duct following injury from cholecystectomy Her general condition was fair her coagulation time was slower than normal about six minutes but she was able to be up and about and for a case of its kind one could describe her condition as fairly good

I operated upon her as I have done in this case found the proximal end of the common duct without difficulty and introduced a T tube as we have done this morning The patient seemed to do unusually well for two days and then rather rapidly within twelve hours lost ground and died from hemorrhage A postmortem was obtained and a very considerable amount of blood was found in the peritoneal cavity and a large duodenal ulcer

I have had 3 or 4 deaths from hemorrhage in these common duct plastics and in bad common duct cases with intense jaundice For a time we used oxalate of calcium with the hope that that would hasten the time of coagulation and have a tendency to prevent parenchymatous oozing that so frequently occurs in these cases That however I think proved to be of little value The question of transfusion before operation of course should be considered I believe it is of some value On the other hand not infrequently where these badly jaundiced cases are transfused before operation and after operation they nevertheless die of hemorrhage

I have learned to regard these injuries of the common duct from cholecystectomies and the common duct plastics that are required for relief as almost the most difficult and serious operation that we do in surgery not only from the standpoint of the risk of the operation but from the uncertainty of the cure

I have had to reoperate several of these cases I have reoperated cases that have been operated upon by surgeons of the widest experience in this work and *my experience has taught me that even with the best technic and the greatest experience we cannot assure the patient of a permanent cure* I have now several patients who are wearing T tubes and have been wearing them for some time perfectly comfortable and happy *as long as the T tube is functionating* Unfortunately however the life of one of these rubber tubes is uncertain Few of them last more than a year and either they have to be replaced or removed and the patient watched *to see if a permanent patulous canal has been secured* Sometimes fortunately this is done On the other hand even in what look like favorable cases after removal of the tube the scar tissue gradually contracts and in a few months the patient is in as bad condition as before and requires another operation and reintroduction of the tube Of course the moral after all is that we must prevent the occurrence of these accidents The brilliant operative work that would restore these injured common ducts by an extensive plastic operation is not to be compared at all in value with the careful technic that prevents the occurrence of these accidents That is the story and the lesson which I would like to give you this morning

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PARAFFINOMA OF NOSE AND LEFT EYELID

Summary Clinical features and surgical pathology of paraffinomas Complete excision the only successful treatment

THE second patient we shall operate upon this morning is an example of a rare lesion This patient presents the picture of paraffinoma What do we mean by the term paraffinoma ? A paraffinoma is a tumor like lesion that develops about some paraffin injected under the skin and is in fact the reaction of the tissues to the irritation of the foreign body and an attempt to break up encapsulated paraffin into small particles

Nothing was known of paraffinoma for some time after we began the use of paraffin as an injection for facial deformities especially for saddle-nose A number of these operations for deformities of the nose had been done before any case of paraffinoma developed These paraffinomas do not follow every injection of paraffin into the tissues In what proportion they do occur I am unable to state Not infrequently the paraffin injected to correct a deformity of the nose remains certainly for a long period of time without producing any reaction In some cases however this unfortunate and very serious reaction develops bringing with it a most distressing picture This patient as you can see (Fig 182) has a large paraffinoma of the nose which is very unsightly and very disfiguring but what is vastly more important he has a paraffinoma of the left upper lid This evidently was an accident in the injection for the nose deformity the paraffin evidently was pushed into the tissues under great pressure and a considerable amount of it found its way into the loose areolar tissue of the left eyelid and as this chronic inflammatory reaction developed the left upper eyelid has become a dense unyielding mass of tissue which prevents absolutely any opening of the left eye He has been referred to me by one of my colleagues a specialist in ophthalmology with the request that I examine the case and do what I

whatever with the nose   If I can succeed in making it possible for the patient to open the left eyelid even one half as wide as normally I shall be quite satisfied with the result because it will give him vision in both eyes   I think he himself will be more than satisfied

It will be impossible of course to undertake an operation of this kind under local anesthesia because of the difficulty in infiltrating this tissue   We shall therefore select drop ether as our anesthetic   We might find it necessary in the operation to use intrapharyngeal ether   yet I think it will be quite possible for Dr Herb to give what we call a sterile anesthetic gown gloves and everything sterile and at the same time not interfere with the field of operation

I now dissect out this dense mass of tissue (Fig 183) and as I proceed with the dissection you will see that there is a large wedge shaped piece of paraffin and new connective tissue enfolding it in the angle between the eyelid and the orbit   In order to make it possible to remove all the involved tissue I am careful to keep my dissection in normal tissue   I can cut down to the cartilage of the eyelid close to the free edge of the eyelid and here I find something of a line of cleavage between the normal tissue and the involved tissue   It is necessary for me however to hug the cartilage pretty closely   As I come up into the angle between the eyelid and the orbit I find that I can take a small sharp chisel and remove the paraffinoma better with this than I can with the knife   As I approach the inner canthus of the eye I must be very careful not to injure the tear duct   At this point there is quite a large mass of paraffinoma extending from the eyelid to the nose   This I also remove with the chisel tearing the infected tissue off from the normal tissue   We have now succeeded in removing all the paraffinoma from the eyelid and I cover the upper eyelid with two Thiersch grafts taken from the back of the left arm   I watch these grafts carefully   There is a little hemorrhage at the outer angle which I control by light pressure for four or five minutes   You will notice that it has now ceased entirely and we can put on a dry gauze dressing

It has been my fortune or misfortune to handle a number of

can for him, the opthalmologist stating that he is afraid that any surgical intervention will be of no service

We have had the patient in the hospital for several days and I have finally decided to make a radical removal of all the paraffinoma tissue of the left eyelid removing as we shall be compelled

Fig 182 —Paraffinoma of nose and left eyelid Note marked disfigurement due not only to the swelling but also to the discoloration of the involved areas

to do, all the skin and make a dissection down to the cartilage of the eyelid and then cover the deformity with a Thiersch graft I certainly shall not undertake at this time to do anything

these cases of paraffinoma One of the earliest cases reported was one I saw in connection with Dr Hyde and Dr Ormsby A woman who had been for years one of the prominent figures in the underworld getting along in years and being distressed by the wrinkles that had developed in her face and about her eyes went to a beauty specialist and had a number of injections of paraffin made some vertical injections which were made between the eyebrows in order to correct some deep vertical wrinkles at that point Injections were made under the lower eyelid under the eyes and oblique injections made on the side of the face leading down toward the angle of the mouth on each side She had been much gratified for a number of months by the improvement made in her appearance the injection having produced no change but a disappearance of the wrinkles Gradually however in each location paraffinomas developed and when she came to me the result was most startling When she took her veil off she looked very much like the make-up of the Devil in Faust—very bright red lines between the eyebrows under the eyelids and on the sides of the face like red face paint which is employed on the stage in make up the only difficulty being that in her case it was beneath the skin and on not on the surface and not removable

This was the first time that I had ever seen this condition and the entire subject was of course new to the profession at that time After consulting however with Dr Hyde and Dr Ormsby I finally made some very extensive dissections removing the paraffinomas and I succeeded in obtaining a very great amount of improvement never however an entire disappearance of the condition but an improvement which was very striking Fortunately in this case the amount of paraffin that had been injected severally was very small

I have seen severally other women with very much the same picture in some of whom the amount of paraffin injected and the reaction resulting was so great that no operation could be considered and I have had no hesitancy in telling them that they must use a veil and that they would have to be satisfied with concealing the condition as best they could
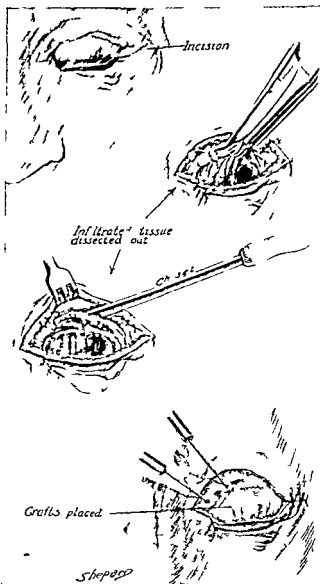
Incision

Infiltrated tissue
dissected out

Grafts placed

Shaped

Fig 183—Technic of operative treatment of paraffinoma of left eyelid

CLINIC OF DR ALFRED A STRAUSS

MICHAEL REESE HOSPITAL

INTUSSUSCEPTION

Summary Diagnosis of intussusception—relative importance of various common symptoms—dependability of the results of fluoroscopic examination Treatment—methods of reducing intussusception and maintaining reduction—resection in cases of gangrene—end to-end anastomosis preferable—technic Theories of the etiology of intussusception After-care

This morning we have a child four and a half months old for operation, with the following history obtained from the mother

The child, previously in good health was suddenly awakened from sleep crying out with severe pain. This subsided for a few moments and then the child screamed again The paroxysms recurred many times in the next few hours The child looked very pale and the mother noticed that it looked very sick evidently in shock Two hours after the onset the child vomited several times and had several bowel movements but no blood was noted in the stool This morning ten hours after the onset the child cries occasionally with pain, but seems better and has more color

The history is almost typical for intussusception with the exception that no blood was noted in the stools I am quite sure if we were to allow this child to go on for another ten to sixteen hours blood would be present in the stools I might say a few words right here regarding the symptoms

Symptoms —The suddenness of the onset is quite characteristic of this condition The remaining symptoms may vary according to the degree of strangulation of the intestinal and mesenteric circulation and the permeability of the lumen of the bowel In enumerating the symptoms I shall attempt to classify

I have had several cases in men and in two of these the amount of paraffin was fortunately limited to an area such that we could remove it entirely by a free dissection Where this could be done of course a very satisfactory result could be obtained I know of no other way except dissection that is of any service in these cases In these facial dissections of course one must take very carefully into account the question of nerve supply and avoid doing any injury producing paralysis of the facial muscles

After-history—The dry gauze dressing was changed at the end of five days and both grafts had taken very nicely The problem that still remained was as to the amount of function that might be obtained The levator palpebræ had been useless for so long that the return of function would probably be slow and incomplete Fortunately after the lapse of a few weeks we succeeded in obtaining an excellent result The left eye can be opened about one-half the normal extent but sufficient s that the patient can see perfectly with it and is delighted

Bloody Stools and Evacuations of the Bowels—In acute cases we usually have one or more evacuations of fecal matter which may vary from thin liquid to formed stools representing the intestinal contents below the obstruction After this has passed we have complete absence of all fecal matter and flatus if the occlusion is complete If the congestion of the intestine becomes more marked and inflammation of its walls begin we have passages containing blood serum and mucus The bloody stools represent one of the most constant symptoms of invagination and are absolutely characteristic of this condition The amount of blood varies from a few streaks to a profuse hemorrhage which may cause death If the intussusception is of the subacute type the hemorrhage may cease for twenty four hours only to reappear more marked than ever When it appears the second time it usually means that we have sloughing of the intestinal wall

Prostration is one of the most marked and characteristic symptoms of this condition It is sudden in development and out of all proportion to the other symptoms especially when associated with great pain Fever of moderate degree or absence of tympanites should lead one to suspect intussusception

The *tumor* of an intussusception is a most important physical sign from a diagnostic standpoint It can usually be felt per rectum providing it is located in the cecal region or in the sigmoid region A tumor may be present and be overlooked on account of the presence of tympanites or it may be located in the upper abdomen where rectal examination will not reveal it By far the largest number of intussusceptions are in the upper right quadrant and therefore it would be physically impossible to feel a mass by rectal examination Therefore as I will show you in a minute this part of the diagnosis is not so important particularly since we have a definite means of making a diagnosis by means of fluoroscopic and Roentgen ray examination

Meteorism—This varies with the degree of obstruction of the intestinal lumen and the seat of the invagination Meteorism is usually late in development and its absence is of diagnostic importance

them according to their diagnostic importance We find a gradual development of a train of symptoms reaching their highest intensity within a short time, more often in a perfectly healthy child though not infrequently we have a history of some intestinal disturbance or, more rarely, one of abdominal trauma The symptoms may appear while the patient is at rest in motion during feeding or while asleep In the majority of cases the first symptom noticed is a sudden violent pain of colicky character, not infrequently appearing to radiate from a definite point. Usually this is followed shortly by vomiting These two symptoms may be considered to be of constant occurrence in young children At this time the child usually has one or two bowel movements They are usually diarrheal in character, later though not invariably, mucus, bloody mucus or pure blood may be passed together with thin liquid bowel contents At this time or even earlier symptoms of marked prostration may soon be followed by collapse The pulse becomes small and rapid The attacks of vomiting usually recur and may become fecal, by which time there is usually no discharge of fecal matter by the anus though some blood or mucoid material may be evacuated Tenesmus is frequently a source of great suffering more especially if the obstruction of the bowel has become complete A rise in temperature in the early stages is rarely observed and some cases may show advanced degrees of meteorism

I want to repeat for the sake of emphasis that *pain* is the first symptom of acute intussusception Its onset is sudden and colicky in character, usually uninterrupted at the onset later becoming intermittent Its location varies with the seat of the intussusception

Nausea and Vomiting—This usually occurs simultaneously with the pain or immediately after The first vomiting may be purely reflex while later it may become fecal in character suggesting an obstruction The vomiting may be continuous or recur at intervals Invaginations of the small bowel usually produce the more common symptoms of vomiting while the vomiting is not as constant and not as pronounced in invaginations of the large bowel

Tenesmus is quite common It is especially severe in intussusception of the sigmoid region and rectum

Now to refer back to the symptoms of this particular case The onset is typical but we lack one very characteristic symptom, and that is the presence of bloody stools In order to obviate any mistake we have given this child a bismuth enema I consider the fluoroscopic examination of such importance that in the last four years I have fluoroscoped all suspected cases of intussusception This gives you an immediate diagnosis and also shows you in what part of the abdomen the intussusception is located To have an exact knowledge of the location of the tumor has the following advantages first it allows you to make a very small gridiron incision over the area where the tumor has been located by the fluoroscope second by being able to make a small gridiron incision right over the intussusception you have a means of preventing evisceration of the bowel which is almost impossible through a right rectus incision especially if meteorism is present third you do not have to hunt for the intussusception which saves time and means less manipulation of the bowels and therefore prevents shock fourth there is practically no chance for hernia or evisceration following the gridiron incision while they are not at all uncommon in midline or right rectus incisions

The technic that Dr Arens our roentgenologist at Michael Reese Hospital and myself have used for giving bismuth enemas is as follows

A very small (No 9) rubber catheter is used instead of the regular rectal tube The small catheter prevents straining and tenesmus The enema can is held up just high enough to allow the bismuth to flow slowly along the colon up to the point of obstruction When we notice a point of obstruction we make gentle pressure upon the abdomen at this point to see if we can force the bismuth further along the colon By doing this we

Fig 184—The various points of intussuscepti on that have been noted under the fluoroscope and in the x ray plates The advantage of see ng these is that the operator is able to make a small inc s on exactly where the intussuscept on occurs

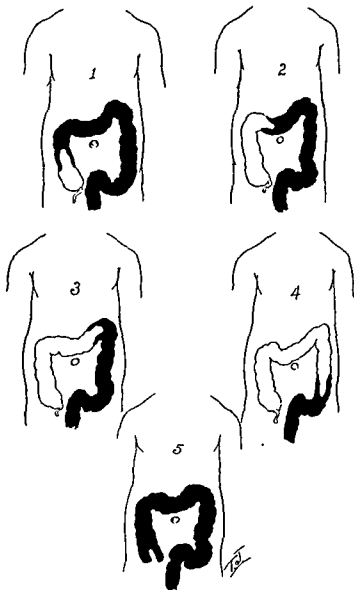Fig 184

is very accessible and has a dough like mass within it which is
the intussusception By following along the colon I find the
intussusception ends in the left hypochondrium exactly as the
roentgenogram showed it On making pressure with the thumb
and index finger above the intussusception and a slight counter
pressure on the intussuscipiens (a rolling up movement—Fig
185) I can reduce it very quickly I have reduced half the length
of the intussusception within the abdomen I will now lift the
balance of the intussusception out of the abdomen to show you
the method of reduction You notice that making pressure
above it reduces the intussusception and you also notice how
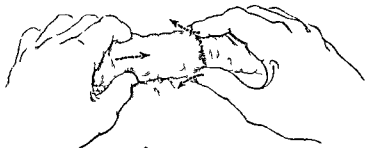much easier and more speedily it reduces when I make counter

F g 185—Method of reduc ng an intussuscept on the ar ows nd cat ng the
d rect on n wh ch pressure s exerted

pressure by intermittent strokes (rolling up movement) The
intussusception evidently was of the ileocecal type which as
you notice from the constriction of the bowel started at the ileum
about $\frac{1}{2}$ inch from the cecum I want to call your attention
to the long free swinging cecum which is of the non rotated
type extending about 2 inches below the gall bladder and I
also wish to call your attention to the relation of the ileum to
the cecum The ileum instead of entering the cecum at right
angles enters almost on a straight line with the cecum (Fig
186 B) The ileocecal valve is very large which I believe is also
an important factor in this type of intussusception

To prevent recurrence of the intussusception I will take two
strips of peritoneum with a small amount of underlying con

get a typical concave shadow (Fig 184) If no intussusception is present the bismuth will flow along the colon and will also pass through the ileocecal valve, for we have learned from fluoroscopy in a large number of healthy children that the ileocecal valve is incompetent in practically 99 per cent of normal children It not only gives you a means of diagnosing your intussusception in the colon but it also gives you an immediate diagnosis of intussusception in the lowest portion of the ileum We recently made a definite diagnosis where we suspected an intussusception with very mild symptoms which we thought was due to a partial obstruction We found much to our surprise that the head of the cecum with the appendix was intussuscepted (Fig 184 5)

As you will notice from our roentgenograms of the case this morning the intussusception is located in the left hypochondrium This is due partly to a loose mesocolon and a non rotating cecum A non rotated cecum is very commonly found in intussusception and was present in more than 50 per cent of the cases I have operated You will note from the roentgenogram that intussusception can occur in almost any portion of the colon sigmoid splenic and hepatic flexures or cecal region You also note that it is possible to have an intussusception of the head of the cecum with the appendix (Fig 184)

Operation —The operative treatment of these cases requires a great deal of surgical judgment on account of the varying amounts of pathology and the damage produced by the intus susception The case we have this morning ought to be a simple intussusception having occurred only ten hours ago

I will now make a gridiron incision in the right hypochondriac region although according to the roentgenograms the intus susception is in the left hypochondriac region but if you will look at the x ray plates carefully you will notice a long Y shaped bismuth shadow This I interpreted as the end of a fairly long intussusception so that the beginning of the intus susception is somewhere in the right hypochondriac region On opening the peritoneum I find the ileum not distended The gall bladder comes into view and appears normal The colon

suception, one twelve months after the first intussusception ope-
ration, and the other three months after Hipsley, of Sidney,
Australia, reports a large number of cases which were operated
on three or four times for intussusception, and one case five times,
with perfect recovery I feel morally certain that by adding

Fig 187 — The peritoneum with underlying connective tissue attached
to the cecum and the first portion of the ileum, making traction in opposite
directions

this last step I can prevent such recurrences in a large majority
of the cases The abdomen is now closed in the usual manner
The type of intussusception which cannot be reduced easily
is usually of three or four days' standing and is usually of a
double type namely an intussusception of the ileum near the

nective tissue and attach them to the cecum and two small portions of omental pedicles from opposite directions are attached to the mesentery of the ileum and to the free edge of the
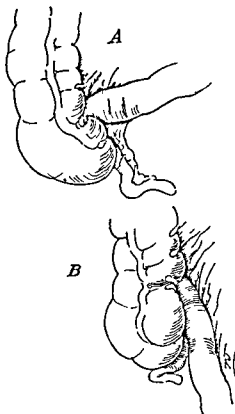

Fig 186—*A* Normal entrance of ileum into cecum *B* Ileum entering cecum with a large ileocecal valve practically on an axial line with the cecum and colon.

ileum opposite its mesenteric attachment I think this last step is of great importance and not enough attention has been called to it It only adds a minute or two to the operation. I have had 2 cases which were operated on previously for intus

susception, one twelve months after the first intussusception operation, and the other three months after. Hipsley, of Sidney, Australia, reports a large number of cases which were operated on three or four times for intussusception, and one case five times, with perfect recovery. I feel morally certain that by adding

Fig 187—The peritoneum with underlying connective tissue attached to the cecum and the first portion of the ileum, making traction in opposite directions

this last step I can prevent such recurrences in a large majority of the cases   The abdomen is now closed in the usual manner

The type of intussusception which cannot be reduced easily is usually of three or four days' standing, and is usually of a double type, namely, an intussusception of the ileum near the
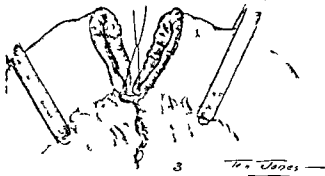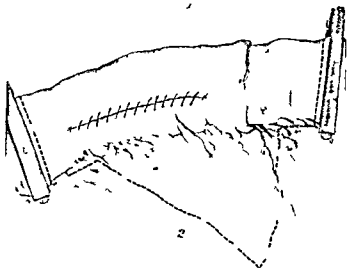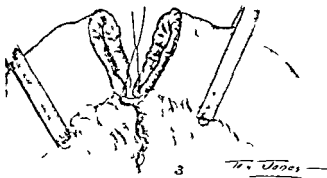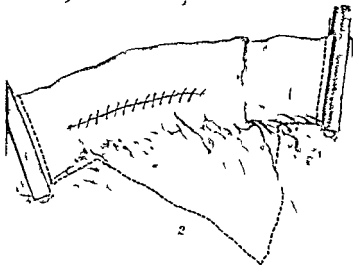
ileocecal valve which, in turns, makes a secondary intussuscep tion through the ileocecal valve an intussuscepted colon In this double type the ileocolic portion is usually easily reduced but not the intussusception of the ileum If the intussuscipiens appears edematous and the reduction seems impossible, it is advisable to open the ileum and inspect the intussusceptum (Fig 188, 1) If it appears black and gangrenous, to try to reduce and manipulate such an intussusception is only a waste of time and produces shock and infection The open bowel should be closed by temporary suture (Fig 188 2) and a block dissection made wide of the intussusception (Fig 188 2), an anastomosis should be made in the following manner, which completes the operation

Very soft, pliable rubber covered clamps are placed some distance away from the gangrenous bowel A resection is then made as indicated (Fig 188, 2) and a second set of clamps are placed some distance behind the first ones and the first ones removed (Fig 188 3), so as to leave 2 or 3 inches of the divided bowel free from the clamp The amount of mesentery resected should only be that portion that absolutely looks black and gan grenous That portion that simply shows a slight inflammation should not be resected but overlapped or used to cover over the suture line after the anastomosis is made The edges of the bowel are held by four tension sutures placed at four different points on the circumference of the bowel so as to make traction (Figs 188 3 189 4) A simple over and over suture of black waxed silk is now used going through all the layers of the bowel (Fig 189, 5) In 2 cases of resection this was the only suture that was used to make the anastomosis the suture line being covered with the free edge of the resected mesentery In these 2 cases the condition of the child was very critical and for this reason time was not taken to put in the second row of Cushing sutures (Fig 189 6) However I believe the second row of

Fig 188—1 Method of open ing intussuscep ens to inspect the intussus ceptum 2 Closure of intussusciptens after the intussusceptum was found to be gangrenous dotted line ind icating area of resection 3 Clamps placed and first guide suture in position for end to-end anastomos s
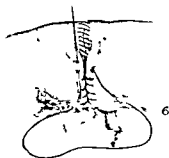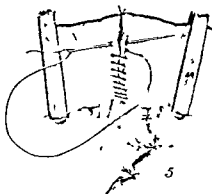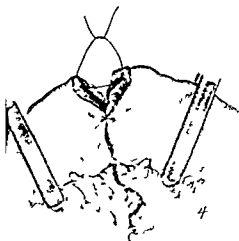
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Fig 188—1 Method of opening intussusceptions to inspect the intussusceptum 2 Closure of intussusceptions after the intussusceptum was found to be gangrenous dotted line indicating area of resection 3 Clamps placed and first guide suture in position for end to end anastomosis

Fig 189

sutures makes the anastomosis more safe In animals I have found that a single row of over and over sutures going through all the coats of the small bowel is just as efficient as two or three layers In these 2 cases of resection in which I used a single suture for anastomosis the children made uneventful recoveries I have several times before resected quite a large portion of the ileum in children whose general condition was poor and in these cases I used a single row of sutures with perfect after results Thus I believe the question of a second Cushing suture may in time prove to be entirely unnecessary in anastomosis of the ileum

I believe that this simple end to end anastomosis and resection of the diseased bowel lessens the shock from manipulating the open intussusception and avoids the spread of infectious material from the gangrenous bowel into the general peritoneal cavity it is far more practical and more physiologic than any other type of anastomosis or operation that has been employed when resection is necessary I believe the type of operation advocated by Schmieden where a resection is made of the intussusceptum after opening the intussuscipiens and the cut end of the intussusceptum is sutured to the inverted intussuscipiens has the following drawbacks You are working with a gangrenous bowel the limitations of which are not sharply defined second the point of entrance of the intussusceptum into the intussuscipiens may later cause cicatrization and constriction producing obstruction third the infected bowel may produce enough toxic absorption to produce toxic paresis of the entire intestinal tract which we see so often in children fourth the infectious material escaping during the open operation may cause peritonitis and death

The advantages of a block dissection are first it is simpler without taking longer second you get rid of all the pathologic bowel thus a simple end to end anastomosis is more normal

F g 189—4 Four tens on sutures placed n pos t on 5 S ngle row of over-and-over sutures through all the coats of the bowel and the mesentery overlapped 6 Second row of sutures n pos t on These are placed after the manner of the Cush ng st tch

and more physiologic and has no tendency to produce a con
striction

Pathology —Very little need be said about the pathology
It varies with the amount of obstruction of the blood vessels and
the amount of constriction and pressure produced in the wall
of the bowel by the intussusception It varies from slight edema
and infiltration of the bowel wall to ulceration gangrene and
sloughing of the intussusception

I would like to say a word here regarding what I believe is a
mistaken idea regarding the time element in intussusception
I have seen several instances where the surgeon advised against
operation because the intussusception occurred seventy two
hours previously and the child was distended In one intus-
susception of only ten hours' standing there may be as much or
more damage as in another case at the end of seventy two
hours While the time element is of some importance, of much
more importance is the type of intussusception and the amount
of constriction produced to the blood vessels and to the walls of
the bowel We find a similar condition in strangulated hernia
A hernia may be down for a number of days with practically no
constriction of the bowel or to its blood supply, while another
one may be black and gangrenous in ten or twelve hours These
variations depend first on the length of the mesentery of the
intussusception and second on the location of the intussuscep-
tion The ileocecal type of intussusception does not become
black and gangrenous as quickly as an intussusception of the
ileum The majority of true intussusceptions of the ileum show
a tendency to become edematous and gangrenous much quicker
than the first mentioned type

Etiology —I believe the difference in the rapidity of growth
between the colon and the ileum during the early months of life
the abnormal relationship of the colon to the ileum and abnormal
contractions or peristaltic waves are important factors in the
cause of intussusception

1 The colon and ileum are almost the same size at birth
The colon grows in width so much faster that at the end of the
fourth to eighth month the common age at which intussusception

occurs the colon is three or four times as wide as the ileum
This rapid growth is usually accompanied by a large ileocecal
valve which practically allows the ileum to prolapse into the
cecum

2 The colon in cases in which intussusception occurs usually
has a long free-swinging mesentery and so has the ileum
This allows the ileum to swing in the direct or long axis of the
colon (Fig 186) As I have mentioned before the cecum in
many of these cases is of the non rotated type which usually
means a long swinging mesentery During the developmental
period of life the intestinal tract has many abnormal contractions
and movements which have to be developed during the develop
mental period of the nervous system This probably explains
the unusual contractions that we see in early life for instance
the pylorospasm which produces the hypertrophy and irregular
tumor of congenital pyloric stenosis is a good example of this
type I believe that the tonic contraction of the bowel during
this developmental period bears a similar relation to that seen in
pyloric stenosis and probably is the starting point of all intus
susceptions where no foreign body or tumor is present When
this tonically contracted loop of bowel moves forward by the
swinging of the ileum the relaxed bowel in front of it practically
pulls itself over the tonically contracted bowel This acts as
the starting point and a series of such contractions pushes the
tonically contracted portion of the bowel forward as a foreign
body would be pushed forward This process keeps on as long
as the loose mesentery will allow the tonically contracted bowel
to move forward and the intussusception will be as long as the
mesentery will allow To repeat I think the important factors
in causing intussusception are first the unusually large caliber
of the colon and cecum in comparison to the small ileum second
a large ileocecal valve and the loose and free-swinging cecum and
ileum allowing the ileum to swing in a straight line with the
cecum and ascending colon producing a prolapse of the ileum
into the cecum third the abnormal tonic contractions of the
ileum and cecum during this developmental period

After treatment —As to the postoperative treatment of these

cases I would like to call your attention to the importance of blood transfusion if the child is in severe collapse In 4 cases in which I did a block resection by the method illustrated in Figs 188 and 189 the children were in severe shock and collapse A blood transfusion was performed in each case through the superior longitudinal sinus (through the anterior fontanel) by a 100 c c Luer syringe and a Brown needle I find this very simple and efficient I believe if you transfuse these children with 100 or 150 c c of blood taken from the mother before operation you prevent shock to a great extent In 2 of my cases of resection I did a second transfusion twelve hours after operation All 4 cases made uneventful recoveries The blood does not have to be tested in very young children up to one year of age In a large number of cases that we have transfused for other conditions we have had no ill results from transfusing from mother to infant without testing out the blood

The after treatment is no different than that employed in any abdominal surgical condition I believe in supplying the patient with fluids subcutaneously or through the superior longitudinal sinus either with blood when the condition is critical or with 3 per cent glucose solution I think many infants can be saved following these operations if transfusion is resorted to The diet should be about the same as that employed in cases of acute appendicitis Cathartics should not be used It is much better to use low 1 1 1 enemas for a few days after operation

CLINIC OF DR EDWARD LYMAN CORNELL

CHICAGO LYING IN HOSPITAL

OCCIPITOPOSTERIOR POSITION AT TERM

Summary Presentation of four patients Discussion of diagnosis complications and general management

WITHIN a week 4 occiput posterior cases have come on my service 3 of them being delivered today The management of occiput posterior positions is exceedingly important for the reason that fetal mortality and maternal morbidity are exceptionally high There are perhaps more babies lost in these cases than in any other single obstetric presentation The reason for this is the failure on the part of the physician to understand thoroughly the mechanism of labor in the posterior position and his failure to make a diagnosis previous to the onset of labor or early in labor The high mortality and morbidity are especially seen in cases delivered by forceps This is due to one or more of the following facts (1) Frequently the forceps are misapplied (2) the traction force is misdirected (3) the forceps are used as rotators of the head without a perfect understanding of the principles regarding such use In occiput posterior cases for example the right the early mechanism differs considerably from occiput anterior In occiput anterior you will recall the head rotates through an arc of 45 degrees while in occiput posterior it is necessary to rotate through an angle of 135 degrees as you will see in Fig 190 The uterus must force the head to rotate through this greater arc It requires considerable force and often much time to accomplish this because the head is practically stationary That is to say the head does not move outward sufficiently to permit an easy turn A mechanic will tell you it is easier to turn a moving object than one which is

stationary This is admirably demonstrated by the driving
of an automobile It is difficult to turn the front wheels while
the car is standing still, but it is exceedingly easy to turn them
while the car is in motion The occiput posterior case can be
compared to the car standing still while the anterior position is
compared to the car in motion In the former, the occiput
descends very little during the early rotation, hence the extremely
difficult and tedious first stage so often seen It is in the manage-
ment of the early stage of this condition that the judgment of
the obstetrician is frequently severely taxed Therefore one
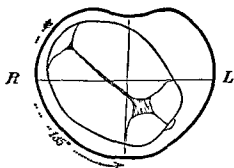
Fig 190 —The occiput must rotate through the 135° arc when it is located
posteriorly

should understand fully the mechanism of labor I will briefly
review this for you

The first stage in labor is the engagement In right occipito-
posterior presentation the occiput engages in the right oblique
with the occiput pointing posteriorly usually slightly forward
of the sacro-iliac joint Along with the engagement is a certain
amount of descent with flexion As soon as the head strikes
the pelvic floor there is an attempt to rotate anteriorly This
occiput has to rotate 90 degrees farther than the anterior pres
entation In this increased rotation the descent is no further
than it would be in occipito-anterior Therefore the head
travels in a circular manner three times as far with the same
amount of descent This requires considerable force on the part

of the uterus and very often a great deal more time which accounts for the fact that these patients are in labor so long especially the primipara After rotation is completed anteriorly the mechanism of labor in both right occipito anterior and posterior is the same The head descends and the occiput impinges under the symphysis Extension occurs along with descent and the perineum begins to bulge With the continuation of this process the head is born over the perineum With the rest of the mechanism you are all familiar

A few points in the diagnosis of this condition may be mentioned Every case in labor should be thoroughly examined at the earliest moment In this hospital on admission the blood pressure is taken the abdomen is palpated the presentation and position determined a rectal examination made and an estimate given of the baby's weight Upon external examination in occipitoposterior cases we find that the small parts are felt in profusion in the anterior portion of the uterus In the type of which we speak they are located on the left side of the patient They are usually easily palpated especially between contractions The fetal heart tones are usually heard well out in the flank on the right side at the beginning of labor As labor progresses and the head rotates anteriorly the heart tones are best heard along a line drawn diagonally from the original location of the tones toward the center of the pubes Upon palpating the head abdominally with a marked depression is usually noted on the left side and none on the right This is due to the fact that there is a depression between the head and the chest Upon rectal examination especially if there is some dilatation of the cervix the sagittal suture will be found in the right oblique instead of the left as would be expected in an anterior position The large fontanel is noticed close to the pubes and the head is usually located higher up There is another fact I place considerable importance upon a point seldom mentioned in text books The external os in the occipitoposterior cases is usually located high up in the sacral hollow I have come to the conclusion that this is a very valuable sign in the rectal diagnosis of occipitoposterior cases

Labor may also terminate in another manner The occiput may rotate posteriorly through an arc of 45 degrees and deliver as such This is known as "persistent occipitoposterior" The mechanism in this type is long tedious and fraught with considerable danger to the child due to excessive trauma to the head It is also likely to be more disastrous to the mother as far as damage to the vaginal tract is concerned because the larger diameters of the head are brought into relation with the anteroposterior diameter of the pelvis after rotation is completed In this method of delivery the forehead instead of the occiput impinges under the symphysis and the occiput has to pass over the hollow of the sacrum In order to do this the shoulders must enter the pelvis at the same time This crowds the pelvic canal stretching it to a greater degree and also forces the uterus to develop more power to push this compact mass through the pelvis It is in this type that the more severe perineal and vaginal tears are seen

I wish to briefly outline 3 cases seen previous to this particular patient

Case 9996 primipara aged twenty three at full term went *into labor at 4 p m December 23d On admission to the hospital the presentation was diagnosed as occiput right posterior* The patient was having good contractions every three to five minutes She was complaining of considerable pain in the back Rectal examination at 12 10 a m December 24th showed that the cervix was effaced and dilated 3 cm The external os was located opposite the third sacral vertebra in the hollow of the sacrum At 4 30 a m the cervix was dilated 8 cm The head did not descend At 5 10 a m a vaginal examination was made *and the cervix manually dilated to 9 cm using gentle force and the bag of waters was ruptured* The patient had been complaining bitterly the last four hours of severe backache The child's weight was estimated at 7 pounds 12 ounces Ether was given the patient during the pains and she was allowed to labor for an hour after the bag of waters ruptured By that time the occiput had rotated to the right transverse position The uterine contractions were very severe and Bandl's ring was forming

quite rapidly, in fact, the uterine contractions were so severe that I was fearful of the life of the child as well as of rupture through the lower uterine segment As the head was in the transverse diameter the patient was put to sleep and the forceps applied in such a manner that the left blade was placed over the left cheek of the baby, well in front of the ear The right blade was placed over the occiput, so that the forceps were in the left oblique diameter Traction was made downward and a slight rotatory motion given to the blades from left to right As soon as the sagittal suture was found to be in the right oblique diameter the forceps were reapplied to the sides of the fetal head without removing them Traction was applied in a downward and outward direction until the occiput impinged under the symphysis The pull was then outward and upward in a wide arc As soon as the head was brought to the perineum and bulging took place, a deep oblique episiotomy was performed on the left side In spite of this precaution there was an extensive tear upward through the vaginal mucous membrane on the left side There was also a tear in the vaginal mucous membrane 2 inches in length on the right anterior vaginal wall Tears can seldom be avoided in primiparæ Almost invariably where forceps are used as a means of rotating the head tears occur even in the hands of experts The vaginal mucous membrane was immediately repaired with a continuous forty-day catgut and the episiotomy was repaired with buried catgut using subcuticular silkworm gut in the skin This baby weighed 8 pounds, 4½ ounces and was in good condition The mother was in good condition when she left the table

The first patient delivered today (December 31st), Case 10127, entered the hospital at 11 30 P M yesterday She is twenty-eight years old para II Her first labor resulting in low forceps September 25, 1918, due to uterine inertia The pains began at 9 30 P M on December 30th After sixteen hours of labor we found that the cervix was effaced, the os dilated 8 cm , and the head well engaged, with the occiput in the right posterior The bag of waters was bulging through the cervix, so that its efficiency as a dilator was gone It was artificially ruptured at

12 45 P M   After the rupture of the bag of waters the pains became much stronger   The patient was allowed to labor one and a half hours longer during which time there was practically no descent of the head   The patient was complaining of the severe pains in spite of the fact that ether was administered during the contraction   It was decided to deliver by means of forceps

On vaginal examination after the patient was asleep it was found that the head still remained in the right occipitoposterior position   To apply forceps in this position and use them to rotate the head through an arc of 135 degrees would necessitate two applications with removal of the blades between   This is *fraught with considerable risk of severe tears*   I endeavor whenever possible to avoid a double application of the forceps   In a large percentage of cases this is successful   Rotation of the head manually can frequently be accomplished   If not it may be *rotated by use of a volsellum forceps grasping the skin over the occiput*   A third method is to push the head out of the pelvis passing the left hand up to the anterior shoulder and rotating the shoulder past the midline to the left side of the uterus   This carries the occiput with it   The occiput is grasped as the hand descends and the head is drawn into the right anterior position   This can be done under light anesthesia, so that the uterine contractions which follow can push the head down where forceps may be easily applied   The head may be pushed down from above by placing the right hand over the lower uterine segment and making pressure in the axis of the inlet   In this latter method it is possible to grasp the scalp with a volsellum in which case the assistant holds the head in the right anterior position by making traction on the volsellum while the forceps are being applied to the sides of the fetal head

In this particular patient manual rotation of the occiput was easily accomplished from below   The occiput was rotated to the transverse position *and the forceps applied* as in the previous case   When traction downward with slight rotatory motion was made the head rotated inside the forceps in such a manner that at the end of two tractions the head was in the anteroposterior diameter   This frequently happens   It avoids re

application of the forceps An episiotomy was done through the old scar on the left side and in this case there was no extension of the tears through the vaginal mucous membrane nor was any other damage done to the vagina or cervix

The estimate given on the baby's weight was 7 pounds 6 ounces, its actual weight was 6 pounds 12 ounces This patient was in the first stage of labor for sixteen and one half hours during which time there was marked molding of the head This child's head was markedly elongated a condition known as dolichocephalus

The next patient No 10 130 was twenty six years old para V Her first labor was instrumental the rest normal The pains began at 8 o'clock this morning and she was admitted to the hospital at 3 30 this afternoon At that time it was noted that the position was right occipitoposterior The cervix was thick and effaced with practically no dilatation The head was not engaged It was estimated that the baby weighed 8 pounds Rectal examinations made at 6 and 8 p m showed 3 and 6 cm dilatation respectively The external os was located posteriorly in the hollow of the sacrum A vaginal examination was made at 9 p m and the cervix was found to be thick and dilated 9 cm The bag of waters was intact It was artificially ruptured The pains were irregular and not strong At 10 p m the cervix was completely dilated and the pains still irregular and weak At 10 03 p m she was given 2 minims of Parke Davis pituitrin The pains immediately picked up and the head came through rapidly At 10 o'clock the head was still in the occipitoposterior position As a result of the pituitrin the fetal heart tones became slower a little irregular but always strong The baby was born at 10 24 p m the occiput having rotated anteriorly The baby weighed 7 pounds 7½ ounces and was in good condition This baby had a slight caput succedaneum over the right parietal bone and there was some overriding of the sutures

The patient about to be delivered No 10 131 is twenty nine years old para II Her first labor resulted in low forceps The pains began at 3 p m today and she entered the hospital at 5 p m Rectal examination made at 5 15 p m showed that the

five to eight minutes apart We will give 3 minims of Parke-Davis' pituitrin It is now 11 o'clock At 11 04 we have one good sharp pain The patient notices the difference At 11 06 another and at 11 08 a third At 11 10 the pain is weak The next pain at 11 15, is a weak one At 11 18 the pain is still weak We will give another 3 minims of pituitrin (11 20) You note that the pains are now picking up rapidly The fetal heart tones are slower and are becoming irregular The fetal head is advancing rapidly There must be some interference with the circulation in the cord, we are able to watch the heart tones frequently since using the head stethoscope In order to hasten delivery we will do an episiotomy on the left side through the old scar The assistant will administer ether crowding it as the head dilates the perineum The baby is born occipito anterior at 11 33 We find that the cord is around the neck once and it fits so tightly that it is impossible to lift it out over the child's head In fact we have difficulty in loosening it from around the neck We will clamp and cut it Two clamps are used as it is impossible to determine which end of the cord is attached to the child We cut between the clamps The shoulders come out in the anteroposterior position and the child cries lustily The patient is now allowed to wake up from the ether The placenta separates easily but there is consider able bleeding This means that we have either a vaginal tear high up or that the placenta is being delivered by the Duncan method The nurse will give 1 c c of pituitrin subcutaneously The placenta is born spontaneously at 11 37 in the Duncan manner This rather rapid bleeding is still continuing so we will clean the perineum carefully and make a vaginal examination We find that the lower uterine segment is filled with clots These are removed The uterus does not contract well so we will inject 1 c c of pituitrin directly into the uterus through the abdominal wall For this we use a 1½ inch heavy needle The left hand is placed in the uterus and the intestines and bladder are pushed out of the way The nurse paints the skin with tincture of iodin about half way between the pubis and umbilicus and inserts the needle at a right angle to the skin The inside

cervix was thick and effaced, with no engagement of the head
The baby's estimated weight was 6 pounds The bag of waters
was intact and the external os of the cervix was located opposite
the second sacral vertebra The pains were irregular, from five
to eight minutes apart, and rather weak The occiput is in the
right posterior position

The nurse will now scrub the patient and at the same time
boil up the Hillis instrument for rupturing the bag of waters
This instrument is a long trocar with a round end and a small,
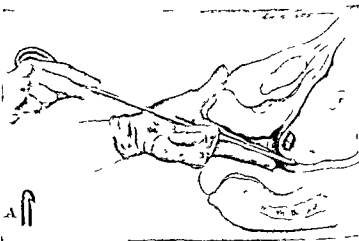
Fig 191—Method of inserting the Hillis instrument The hook is
fastened to the membranes and pulled upward and outward This prevents
the fetal head from being injured A Head of Hillis instrument

sharp projecting point on its upper surface (Fig 191) The
Hillis instrument is grasped in the right hand and passed into
the vagina with the projecting point upward It is guided into
place by the fingers of the left hand The membranes are pierced
between pains This is done to prevent as far as possible the
cord from prolapsing The rush of water under pressure fre-
quently carries the cord with it The membranes are thick and
as the cervix is completely dilated they are of no further use
You notice that the pains are irregular and weak coming from

first day The highest pulse was 96 on the day of operation
The baby left the hospital in good condition It weighed 8
pounds 1¼ ounces Examination at the end of six weeks showed
that the cervix was closed firmly the uterus in proper position
the vagina showed scars resulting from the tears the episiotomy
wound was in good condition

The second patient (No 10 127) left the hospital on the
twelfth day in good condition Her highest temperature was
98 6° F and highest pulse 84 The baby's highest temperature
was 99 4° F on the fourth day Its weight was 6 pounds 14
ounces Examination six weeks after delivery showed that the
uterus was in good position and that the episiotomy wound had
healed nicely without any cupping

The third patient (No 10 130) suddenly developed a tempera
ture of 101 8° F on the fourth day after delivery At the same
time she complained of considerable pain in the left groin She
had symptoms of a thrombophlebitis in the left leg but it cleared
up rapidly The baby's highest temperature was 99 8° F on
the third day

The fourth patient (No 10 131) left the hospital on the thir
teenth day her highest temperature being 99° F and highest
pulse 90 The baby's highest temperature was 99° F on the
ninth day The weight was 6 pounds 5½ ounces
Examination six weeks after delivery showed the episiotomy
wound in good condition and the uterus in proper position

hand notes the position of the needle It is now in the uterus having passed through the skin and the structures intervening The pituitrin is injected The first thing noted by the made hand is an area about the size of a twenty five-cent piece which becomes very firm In about thirty seconds this spreads to an area the size of a half-dollar and then suddenly the uterus contracts You must be careful not to get the hand caught in the uterus at this time as the contraction is usually very firm On removing the hand any clots of blood should be brought out at the same time You notice that the uterus now stands up in the abdomen and that the bleeding has practically stopped. We note that the vagina is not torn We will now repair the episiotomy wound using buried catgut sutures and subcuticular silkworm gut in the skin

I wish to call your attention to this placenta It is the type known as placenta circumvallata You note here a thick fibrous band which completely encircles the placenta on the fetal surface It is located about ⅜ inch from the outer portion of the cotyledons This is due to the fact that the ring of Waldeyer probably prevented the placenta from growing outward There are several views regarding the cause of this condition. One is that there are inflammatory changes in the decidua which cause various grades of necrosis thus temporarily preventing the growth of the placenta Another is that the placenta is located either in the cornua of the uterus or along the internal os and that the placenta grows faster than the rest of the uterus A third view is that endometritis causes adhesion of the decidua reflexa to the vera and a fourth that there is a sudden diminution in the liquor amnii causing the covering of the ovum to shrink These placentæ circumvallata are of importance clinically because hemorrhages sometimes occur usually early producing abortion The cord in this case is eccentrically attached and the membranes are complete

AFTER-HISTORY

The first patient (No 9996) left the hospital on January 3d feeling well Her highest temperature was 99 2° F on the

A CASE OF OCCIPITOPOSTERIOR POSITION COMPLICATED BY LOBAR PNEUMONIA AND FRACTURED RIB

THIS patient was first seen by me December 18 1919 She is thirty four years old para IV She has been married for fourteen years and is a Christian Scientist Her last period was April 16th In June July and August she spotted for one day only Her family history is negative She was operated upon for an ovarian cyst on the right side fourteen years ago and the appendix was removed also She was curetted five years ago for what purpose is not known Her first pregnancy was normal and the baby weighed 6 pounds The second was normal the baby weighing 8 pounds The third labor was instrumental the baby weighing 9¾ pounds At this delivery she was badly torn There was no repair Since her last delivery she has had pain in the back and in the legs Her health in December when I first saw her was poor apparently because she was unable to sleep on account of the pains and cramps in her legs There was no nausea or vomiting to speak of She had swellings from the ankles to the knees and an occasional headache She was very constipated and her appetite was fair She also had some pains in the lower abdomen The blood pressure was 128 systolic and 76 diastolic

Shortly after I saw her the weather became very cold and her apartment was inadequately heated She said that it was difficult to keep the temperature even around 54° F On the 24th of December I was called to see her and found her suffering from a left lobe pneumonia the entire left lobe being involved At that time I advised the hospital but she refused as she wished the services of a Christian Science practitioner On December 30th I saw her again The left lung was still involved and there was apparently some pleurisy with effusion Her condition however was somewhat better She said that it was January 6th I was called again as she complained of severe pain in the right side which

,

The problem that confronts us is how to handle this serious complication with the best result to mother and baby Shall we deliver from below or from above? I feel that delivery from above offers considerable more risk to the mother than we are justified in taking In all probability she still has pneumococci present in her blood and at least in the lungs and she might get a general peritonitis or an abscess in the uterus or abdominal wound so that we will reject this method There remains therefore delivery from below How shall it be accomplished?

The cervix on examination is effaced and admits the finger readily No doubt it can be dilated without much trouble because this is her first pregnancy There are no scars to interfere very much with its dilatation We might dilate manually and do a version bringing down the foot This necessitates putting the patient asleep allowing her to wake up and perhaps later giving another anesthetic in other words subjecting this patient to two anesthesias In her present condition this risk should be avoided if possible Another method would be to insert the bag using some pressure Taking everything into consideration I believe that this is the proper method to pursue in this particular instance We will therefore insert the bag We find on vaginal examination that we are able to dilate the cervix rather readily the dilatation being accomplished by gentle maneuvers of the fingers in such a manner that pressure is exerted on the entire periphery of the cervix that is to say the hand is turned so that the fingers never press the same spot twice in succession

I have succeeded in dilating the cervix to 4 cm The patient is complaining somewhat but not sufficient to be harmful An 11-cm bag is inserted at 5 20 P M We will now put a 1 pound weight on it This is done by attaching a cord or tape to the end of the bag carrying it over the foot of the bed using a pillow to catch the weight in case the bag comes out We will allow a reasonable length of time for the dilatation to be completed

Rectal examination at 7 30 P M shows the cervix dilated to 7 cm The patient is having pains somewhat irregular, and the baby's heart tones are in good condition We will allow her to

came on suddenly after a severe attack of sneezing   A diagnosis of fractured rib on the right side was made   The patient stated that she had had no bowel movement for seven days   She also had severe cramp-like pains in the lower abdomen and in the legs   She refused to take medicine stating that she would soon have a bowel movement with the aid of Christian Science   She was in bad condition at that time and I strongly urged the family to move her to the hospital but without success

On the morning of January 9th I was informed that the patient was entering the hospital   Upon admission she was in very poor physical and mental condition   She entered the hospital with a fractured rib   no bowel movement for ten days   with nausea and vomiting which had kept up for twenty four hours   The vomitus now contained blood and bile and had a slight fecal odor   She had lost a great deal in weight   She had a temperature of 101° F   Her pulse was rapid and weak   The left lower portion of the chest was dull to percussion and evidently contained some fluid   The baby was apparently in good condition   near full term and an occipitoposterior   It was decided to allow the patient to remain in bed for a few hours to recover somewhat from the trip to the hospital and then to induce labor

As you will notice by her general appearance she is not a good risk for serious operative work if it can be avoided and yet I think you will agree that she should be delivered promptly   During the interval between her admission and removal to the operating room at 5 P M a matter of some six hours she has had a milk and molasses enema with no result   a 1 2 3 enema with no result   The exertion of these enemas has been anything but salutary so that further efforts to produce a bowel movement have been thought inadvisable   You will note that the abdomen is markedly distended with gas and the patient is still vomiting in spite of the fact that we have given large quantities of soda solution by mouth   I have purposely refrained from washing the stomach because I feel that her condition is such that the

his hand on the fundus of the uterus The nurse will now give
1 c c of pituitrin subcutaneously We will do this before the
placenta is delivered because we do not wish this patient to lose
much blood, and second this is an induction of labor and we are
liable to have uterine inertia at this point The baby is in
good condition and the shoulders are delivered readily The
baby is born at 8 35 P M The patient is bleeding rather pro
fusely, probably from the cervical incision The uterus does
not contract well and as the bleeding is keeping up it will
make a vaginal examination and determine its source We find
the lower uterine segment filled with clots and the placenta
presenting by the Duncan method We will assist in its delivery
by making pressure from above, gently pulling on the body of
the placenta from below In order to avoid any further loss of
blood we will inject 1 c c of pituitrin directly into the uterine
wall through the abdomen The uterus now contracts firmly
You will notice that the patient's bowels are now commencing
to move very freely It is very fortunate that we have no
episiotomy or other repair work to do We will not repair the
cervical incisions because of the patient's history of a recent
infectious disease Usually the bleeding from these incisions is
very slight and easily controlled without suturing It is really
surprising the amount of fecal matter which is being discharged

After-history —The patient's highest temperature was 101°
F on the fourth day She was given nothing by mouth and 10
per cent glucose solution in normal salt solution per rectum by
the Murphy method Eighteen hours after this was started it
was found that she was unable to retain the liquid per rectum
and that the vomiting had ceased so small quantities of water
and liquids were given by mouth at intervals In thirty six
hours the patient was much better and requested some food
She was placed on a soft diet for three days at which time her
temperature was normal and her general condition was much
improved Her diet was gradually increased and by the seventh
day she was eating the regular hospital food She insisted on
nursing the baby and it was placed to the breast on the fourth
day She was up out of bed on the thirteenth day and discharged

continue a while longer and endeavor to obtain complete dilatation The patient's pulse is becoming more rapid she is still vomiting and all in all her general condition is gradually becoming worse We will increase the weight on the bag to 2 pounds This is not a general procedure because a weight of this size prevents the cervix from obtaining its proper circulation and in some cases it might produce serious results such as sloughing after delivery I feel that in this case however brisk procedures are indicated provided they are not extended over too great a period

Rectal examination at 8 P M shows that the bag is nearly ready to come out We will now get ready for delivery The outfit for vaginal cesarean section is being prepared I am doing this in order to be ready to meet any emergency that might arise The patient is placed on the operating table and the bag removed We find upon vaginal examination that we have about 8 cm dilatation and that the cervix is rather firm and thick and that the head presents midplane in the right occipitoposterior position The patient's pulse is rather weak (116) An attempt at delivery will now be made

The head is rotated anteriorly using the left hand It is kept in position by the assistant making deep pressure over the inlet abdominally The patient is given a combination of nitrous oxid oxygen and ether Forceps are applied obliquely and traction is made downward and out This brings the head forcibly against the cervix and we find that the cervix is tight and does not dilate readily We will now make Duhrssen incisions in the cervix at 10 2 and 6 o'clock The incisions are carried about 1 inch or 1½ inches up the cervix at these points At the next traction the head comes through rather rapidly but as it is not molded to any extent you will notice it is with considerable difficulty that the occiput is brought down under the pubis Because of the severe laceration she received with the last delivery it is not necessary to do an episiotomy As the head comes down over the perineum we use plenty of time and slip the head out gently The forceps are removed and the baby's mouth wiped with mouth swabs and the assistant places

CLINIC OF DR DANIEL N EISENDRATH

Michael Reese Hospital

TUBERCULOSIS OF A HERNIAL SAC WITH A BRIEF CONSIDERATION OF ABDOMINAL TUBERCULOSIS IN GENERAL

Summary Etiology pathology diagnosis and treatment of the more common varieties of abdominal tuberculosis

The case which I present to you today especially illustrates the difficulty of recognizing tuberculosis of the peritoneum in some of its clinical pictures   The entire subject of abdominal tuberculosis is one which should be carefully studied by every surgeon because the disease may masquerade as acute or chronic appendicitis as salpingitis as a cecal tumor as ascites without apparent cause and as a number of other conditions which we are accustomed to think of as being of non tuberculous origin   It will be impossible today to give you more than a bird s eye view of such a large number of diseases but even with this perspective you may stop and consider the possibility of a tuberculous infection as the underlying cause of clinical pictures which one usually associates like ascites with diseases of non infectious origin or like the other forms of abdominal tuberculosis with conditions which are due to organisms of the ordinary pyogenic group

Presentation of Case —This patient a man of fifty seven was admitted to the surgical ward three weeks ago complaining of the recent discomfort caused by a large right sided inguinal hernia which had been present for many years without causing any symptoms   He had never worn a truss and had made no effort to keep the hernia reduced   Examination of the man before operation did not disclose anything which would lead one

on the fifteenth day in good condition. The rib was not entirely healed and the left lung was in much better condition.

Examination at the end of six weeks showed the cervix to be in fair shape only slight depressions remaining where Duhrssen incisions were made The body was in good position and the patient was rapidly regaining her strength She was nursing the baby and it was doing well

with a general reddening of the entire peritoneum (Fig 192)
A similar change was visible in the serosa of coils of ileum which
constituted the contents of the sac Upon retracting the edges
of the neck of the sac at the internal ring we found that the same
condition was present on all of the visible parietal and visceral
peritoneum The latter was much thicker and more injected
than normal, was rough and had lost its characteristic normal
luster From this description alone and a glance at a drawing
made at the time of operation (Fig 192), it will not be difficult
for you to make a diagnosis of tuberculosis of the peritoneum
of the "dry i e non-exudative type which had caused no
general abdominal symptoms

The local manifestations of discomfort referable to the
hernia were insufficient to lead one to suspect generalized tuber
culosis of the peritoneum

Although this is my first case of tuberculosis of a hernial
sac I find that the condition is by no means a rare one Hertzler
in his excellent monograph [1] gives a thorough review of this
subject

Collective papers have appeared at intervals since 1849
when the first cases were reported by Cruveilhier Only one
case was diagnosed before operation The changes in the hernial
sac represent as they did in our case simply a continuation of the
more generalized involvement of the peritoneum

The thickening of the hernial sac as in our patient is the
same as one encounters in the parietal peritoneum of the major
ity of cases of tuberculous peritonitis

The variety of hernia does not play a rôle because such
changes may be found in any form of abdominal hernia You
will understand the reason for this when I discuss the subject
of tuberculous peritonitis in general and will agree that it is
exceedingly difficult to make a diagnosis before operation No
doubt the chronic inflammatory changes in the serosa of the sac
and contents of this patient s hernia were the immediate cause
of his applying to the surgeon for relief

The neck of the sac was ligated high up as is our custom, and

[1] Diseases and Treatment of the Peritoneum vol ii p 693 1919

to suspect an unusual condition in connection with the hernia The abdomen was not distended or tender and there was a complete absence of subjective symptoms except those referable to the hernia The latter was reducible moderately large and had no special features to distinguish it from hundreds of other

Fig 192   Appearance of open sac in case of tuberculosis of the hernial sac Note miliary tubercles upon serosa of the coil of intestine found in sac and also upon the inner aspect of the sac itself

inguinal hernias which one encounters in a large metropolitan hospital

The operation was done under local ($\frac{1}{2}$ per cent novocain) anesthesia The sac was very thick and upon opening it we were greatly surprised to find that the interior of the sac was studded everywhere with pearly white millet seed sized nodules

picture of an acute disease This has led to many errors of diagnosis and not infrequently, as I shall show you later, cases have been operated upon as acute appendicitis, intestinal obstruction salpingitis etc , which in reality were only the acute form or mode of manifestation of abdominal tuberculosis It is of interest in this connection to note that Kayser found that of 39 cases of tuberculous peritonitis of all varieties 14 began in an acute manner, and in only 25 was there a gradual development of symptoms Of 13 cases of ileocecal tuberculosis 2 began in an acute manner In primary tuberculosis of the mesenteric lymph nodes not only Kayser but a number of others including myself, have described an acute mode of onset to which I will refer later, which resembles in every respect that of acute appendicitis or other right sided acute abdominal affections Of 10 cases of tuberculosis in the tubes observed by Kayser, 5 had as acute an onset as we are accustomed to see in ordinary acute pyogenic salpingitis

Tuberculosis of the Spleen and Liver —This occurs either in miliary form or as a local tuberculosis involving the bile ducts, or as a solitary tubercle The miliary form usually occurs in connection with generalized miliary tuberculosis and does not present any symptoms especially referable to the liver The same is true of tuberculosis of the bile ducts A solitary tubercle also presents no characteristic symptoms and does not occur as often in the human being as in the lower animals It is very exceptional for tuberculous masses in the liver to be sufficiently large to be felt through the abdominal walls during life I shall refer later to the frequent association of cirrhosis of the liver with tuberculosis of the peritoneum but there is nothing about this form of cirrhosis of the liver which enables one to recognize it as an independent affection from the accompanying tuberculosis of the peritoneum

Tuberculosis of the spleen occurs in practically the same pathologic forms as that of the liver The miliary form cannot be recognized as an independent disease and it is very rare for the other variety, namely localized tuberculosis to be sufficiently large to be recognized during life

the operative procedure did not differ from that used in an ordinary—i e non tuberculous—case The wound has healed by first intention

We have examined the patient for a possible primary focus since the operation and have found a very suspicious area in the apex of the left upper lobe but so far have not found any tubercle bacilli in the sputum

CONSIDERATION OF ABDOMINAL TUBERCULOSIS IN GENERAL

Fifteen or twenty years ago when one spoke of abdominal tuberculosis it was generally understood that tuberculous peritonitis constituted practically the only form of localization of the tubercle bacilli in the abdomen Since that time as a result of many contributions to the subject we have learned that there are a number of other localizations of the tubercle bacilli which can give rise to quite independent clinical pictures and which are not necessarily followed by tuberculous peritonitis I shall first consider the various abdominal viscera in which tuberculosis may occur and then discuss briefly our present views in regard to abdominal tuberculosis Tuberculosis of the genito-urinary tract in the male and of the urinary tract in the female will not be included since these belong under a separate heading

A very convenient grouping is as follows

1 Tuberculosis of the liver and spleen
2 Tuberculosis of the alimentary tract
    (a) Stomach
    (b) Small intestine
    (c) Appendix
    (d) Cecum and ascending colon
3 Primary tuberculosis of the mesenteric lymph nodes
4 Tuberculous salpingitis
5 Tuberculous peritonitis

The first tradition which we must discard in this subject of abdominal tuberculosis is that the symptoms of any of the above localizations appear in an insidious manner and develop slowly There has been much confusion because of the generally prevalent opinion that abdominal tuberculosis cannot appear under the

picture of an acute disease This has led to many errors of diagnosis and not infrequently as I shall show you later cases have been operated upon as acute appendicitis intestinal obstruction salpingitis etc which in reality were only the acute form or mode of manifestation of abdominal tuberculosis It is of interest in this connection to note that Kayser found that of 39 cases of tuberculous peritonitis of all varieties 14 began in an acute manner and in only 25 was there a gradual development of symptoms Of 13 cases of ileocecal tuberculosis 2 began in an acute manner In primary tuberculosis of the mesenteric lymph nodes not only Kayser but a number of others including myself have described an acute mode of onset to which I will refer later which resembles in every respect that of acute appendicitis or other right sided acute abdominal affections Of 10 cases of tuberculosis of the tubes observed by Kayser 5 had an acute an onset as we are accustomed to see in ordinary acute pyogenic salpingitis

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Tuberculosis of the Alimentary Canal.—(a) *Stomach*—Broders has recently made an extensive study of the subject, and finds that gastric tuberculosis may be divided into six types (1) Early single or multiple (2) miliary tubercle (3) solitary tubercle, (4) direct stenosis, (5) single or multiple tubercle or nodule, (6) lymph nodes

Ulcer is the predominating lesion and most frequently involves the lesser curvature It is never primary in the stomach and there are no characteristic symptoms to enable one to distinguish it from an ordinary non tuberculous ulcer

(b) *Small Intestine*—This is usually, like tuberculosis of the stomach secondary to the same disease el ewhere in the body It is almost always present in cases of pulmonary tuberculosis and less frequently after tuberculosis of the male or female genito-urinary tract That it may however occur as a primary affection there can no longer be any doubt Under these circumstances it is assumed that the tubercle bacillus passes through the intact wall of the intestine usually the ileum without leaving any trace of its passage This form is most apt to occur in children as the result of the ingestion of milk or butter containing tubercle bacilli It is estimated that about 10 per cent. of the cases of tuberculosis in children have such an origin The tubercle bacillus is usually of the bovine type and after passing through the wall of the intestine enters the mesentenc and retro-peritoneal lymph nodes giving rise to symptoms of tuberculosis of these which will be described later in connection with the acute forms of tuberculosis of the mesenteric lymph nodes

Carlson in a recent paper on this subject distinguishes two groups of tuberculosis of the small intestine namely (a) the simple tuberculous ulcer and (b) the stenosing or tumor type About 95 per cent. of the cases belong to the first named group As I have just stated the ulcers are a very common finding in the autopsies of patients dying from pulmonary tuberculosis and are of surgical interest only if perforation fistula fecal abscess or ileus occurs The second or stenosing type may lead to chronic obstruction of the intestine So far there have only been about

100 cases of this tumor or stenosing type published. The pathology of this form is very much like that of the tumor form of ileocecal tuberculosis and I will refer to it under that heading

So far as the symptoms are concerned there may be none in either the ulcerative or tumor form of intestinal tuberculosis Usually however there is diarrhea which is very obstinate and one must always suspect such a complication in pulmonary tuberculosis if there is more fever and emaciation than the pulmonary focus would account for. The diagnosis is confirmed by finding tubercle bacilli in the stool Involvement of the overlying peritoneum is quite common. During a visit to one of the surgical clinics in the East I saw a case of acute intestinal obstruction due to stricture following such an annular tuberculous ulcer

The clinical picture of the second type is that of an enterostenosis of gradual onset quite similar to that seen in ileocecal tuberculosis For a long time we have indefinite abdominal symptoms such as diffuse pain etc and later this becomes more localized and severe and not infrequently one is able to palpate a tumor in the vicinity of the lowermost portion of the ileum To sum up the surgeon is interested in the complications of ordinary annular tuberculous ulcer and also in the second and more recently observed form in which there is a tumor formation with gradual narrowing of the lumen of the gut

(c) *Appendix*—This may occur in the acute or chronic form The former occurs in connection with tuberculosis of the ileocecal nodes under the clinical picture of acute appendicitis as I have already described In a number of these cases only microscopic examination will enable one to say that the tuberculosis of the appendix was the primary involvement The chronic cases of tuberculosis of the appendix are most frequently associated either with tuberculosis of the cecum or tuberculosis of the peritoneum The chief sources of infection are the same as those outlined in connection with mesenteric lymph node tuberculosis namely ingestion of milk cheese and butter from tuberculous cows These form an ideal medium for the proliferation of the tubercle bacilli Butter is a greater danger than milk 60 per cent. of the cases of tuberculosis of the appendix

show tubercle bacilli of the bovine type I have seen a number of cases in which the patients gave a history of having had an appendectomy after an apparently acute appendicitis followed within a few months (Figs 193 194) by evidences of a diffuse or encapsulated tuberculous peritonitis There is no longer any doubt in my mind that these were cases in which the appendix was of tuberculous nature and removal of the appendix alone did not suffice to check the process There are on record a number of cases in which removal of the indurated and inflamed tuberculous mesenteric lymph nodes at the same time that the appendix was removed resulted in complete recovery without the development of secondary peritonitis

(d) *Cecum and Ascending Colon* —This form of tuberculosis was first called to our attention by Durante in 1890 It may begin gradually, so much so that there is nothing characteristic about the clinical picture until a tumor is found This may in some cases be preceded by local pain and a little later by symptoms of chronic intestinal obstruction Some of the cases are operated upon in the early stages for chronic appendicitis and not infrequently, even in the tumor cases the diagnosis is not made unless microscopic examination follows I have recently operated upon a case in which the patient gave a history of rather acute onset three weeks before entering the hospital. When first seen in our ward the clinical picture was that of a subsiding attack of acute appendicitis Upon opening the abdomen however I found the wall of the cecum enormously thickened and such dense adhesions to all the surrounding structures that it was not difficult to make a diagnosis of tuberculosis of the cecum with secondary involvement of the appendix As a rule the tumor is hard nodular and sharply demarcated toward the rest of the bowel and looks like a neoplasm In a few cases the tumor is spindle shaped and there is a gradual transition of the indurated tissue into the normal type As was observed in my own recent case the appendix may often be included in the process and the adhesions to the adjacent tissues and to the omentum and the presence of a mass of enlarged lymph nodes and in forming an irregular tumor If one can

find caseous lymph nodes in the mesentery of the ileocecal region or small subserous tubercles the diagnosis is easy but in many cases it is only possible to differentiate it from carcinoma by microscopic examination   In advanced cases the wall of the cecum is enormously thickened especially the submucous and subserous coats   The tendency to caseation and ulceration is not very great the chief characteristic being an excessive increase in the connective tissue of the bowel wall hence the condition is frequently called the hyperplastic form of ileocecal tuberculosis

The condition occurs between the ages of ten and sixty The clinical picture is that of a slowly developing stenosis plus tumor of the cecum and ascending colon   There is little or no temperature as a rule unless there are complications such as abscess formation fistula or similar conditions due to perforation of the wall of the cecum with involvement of the adjacent tissue especially of the abdominal wall

The condition is often mistaken for carcinoma sarcoma syphilis and actinomycosis   Tuberculosis runs a much slower course than either carcinoma or sarcoma and is less sharply demarcated than carcinoma toward the adjacent bowel wall The differentiation from syphilis and actinomycosis is very difficult before operation unless fistulæ are present in which the ray fungus is found

Unless operated upon the stenosis increases and ulceration of the cecal wall with fistulous formations occurs   Radiographic examination is of great aid in making a diagnosis of this condition but does not always render it possible to distinguish tuberculosis from sarcoma carcinoma syphilis or actinomycosis

Primary Tuberculosis of the Mesenteric Lymph nodes — This may occur in either an apparently primary or secondary form   The latter is not infrequently a complication of tuberculosis of the small intestine in children or young adults and involves the mesenteric and retroperitoneal lymph nodes   As I have stated under the head of Tuberculosis of the Small Intestine the tubercle bacilli may penetrate the wall of the intestine without leaving any trace the mesenteric lymph nodes under these circumstances undergoing in some cases caseation in others

the pathologic process seems to tend more toward the hyperplastic form of enlargement so that quite good sized tumors can be palpated through the abdominal wall I have recently shown you a case in connection with the subject of tumors of the abdomen in which such an indurated mass lying at the root of the mesentery in a young man of twenty caused us to think of the possibility of a neoplasm

If the mesenteric and retroperitoneal lymph nodes are involved the absorption of fat from the intestine is decreased resulting in marked emaciation anemia fever and a continuous type of fatty stools so characteristic of what was formerly termed 'tabes mesenterica'

This secondary or diffuse involvement of the mesenteric lymph nodes is not accessible to surgical interference and its non-operative treatment will be taken up a little later in my lecture in connection with the treatment of abdominal tuberculosis in general

The primary form of tuberculosis of the mesenteric lymph nodes is a subject of great interest The clinical picture in many cases resembles that of acute appendicitis and gives an involvement of the nodes almost as an apparently primary process I have called attention to this subject in a paper on the acute forms of abdominal tuberculosis published in 1909 I collected at that time a number of published cases in which the onset was so sudden that it was impossible to make a diagnosis before operation of the tuberculous nature of the condition The most common seat of trouble is the ileocecal group and the pathologic changes vary from acute enlargements of the nodes with small areas of caseation to complete caseation or in some cases hyperplasia or as a terminal condition calcification of the nose

Apparently primary mesenteric lymph node tuberculosis occurs most frequently between the ages of ten and fifteen In some the onset is not so acute as to resemble an acute appendicitis We have only anemia caseation or night sweats to lead one to suspect an occult tuberculosis In three-fourths of the cases however pain is present as a most important initial sign and may

be accompanied by high fever The differential diagnosis in these cases must be made from acute appendicitis chiefly

It is of interest in this connection to say that Harte and Rabinovitch found the bovine type of tubercle bacillus in 83 per cent of these primary cases of tuberculosis of the mesenteric nodes Strictly speaking these cases are not primary cases and the focus either exists in the wall of the intestine or appendix so that the tubercle bacilli migrate through the intact wall The fact that they are of the bovine type shows that they enter the lymphatic circulation following the ingestion of milk or butter containing tubercle bacilli

Tuberculous salpingitis involves either the mucous membrane lining the fallopian tube or the peritoneal covering The latter is usually a complication of a general tuberculous peritonitis The involvement of the interior of the tube results in some cases in early closure of the fimbriated end with the retention of caseous debris within the lumen of the tube quite analogous to the pathologic changes which occur in gonorrheal salpingitis In a relatively larger number of cases there is a tendency toward hyperplasia of the wall of the tube with marked diminution in its lumen so that tumors are formed which greatly resemble in their pathology that described earlier in my lecture as being so characteristic of the ileocecal and certain types of intestinal tuberculosis

Tuberculous Peritonitis—I have postponed the discussion of this portion of the subject because it is impossible to understand why tuberculosis of the peritoneum is invariably a second ary localization of the organism unless one possesses some information in regard to the atria of infection

The most satisfactory division of these primary foci is into (a) those in distant portions of the body i e extra abdominal and (b) those within the abdominal cavity (exclusive of tuberculosis of the urinary tract in the female and of the genito urinary tract in the male)

In the first group the bacilli reach the peritoneum as a rule through the blood stream i e the infection is a hematogenous one In the second group the bacilli involve the peritoneum

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hence it is advisable to speak of three forms of the disease
(a) The cases in which there is free fluid i e the ascitic form,
(b) those in which there is an encapsulated fluid (Figs 193-195),
and (c) those in which there is no exudate   Some writers prefer

Fig 194 —Side view of the same case shown in Fig 193 The stomach
and intestines were adherent to each other and pushed toward the left and
backward by the encapsulated collection of tuberculous pus

a division of the cases into the (a) exudative (b) the adhesive
and (c) the nodular types This is excellent from the standpoint
of pathology but I have always found the division just given
easier to associate with the clinical pictures as we encounter

either by the continuity of the infection in the tissues or by way of the lymphatics, or as the result of a rupture of a tuberculous mesenteric lymph node   The most frequent extra abdominal primary foci are the lungs cervical lymph nodes, bones, epi
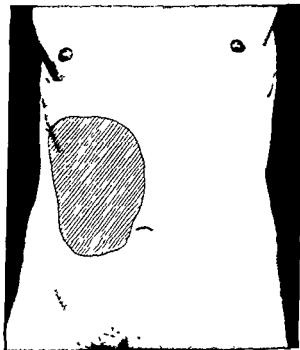

Fig 193—Shaded area represents dulness in a case of encapsulated tuberculous peritonitis   History of acute onset six months before simulating an acute appendicitis   At operation a large quantity of purulent fluid evacuated from cavity whose walls were formed by agglutinated coils of intestine showing typical tuberculous changes

didymi, kidneys, etc   The most common intra abdominal sources of infection are the appendix the small and large intestine, the fallopian tubes, mesenteric lymph nodes spleen liver, and stomach

The clinical pictures vary according to the pathologic changes,

hence it is advisable to speak of three forms of the disease
(a) The cases in which there is free fluid, i e, the ascitic form,
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a division of the cases into the (a) exudative (b) the adhesive
and (c) the nodular types   This is excellent from the standpoint
of pathology, but I have always found the division just given
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them at the bedside You must understand of course that
there is no sharp line between these three forms the cases with
free ascites may appear at a later period of the disease with
encapsulated fluid Again the dry or adhesive type may reveal
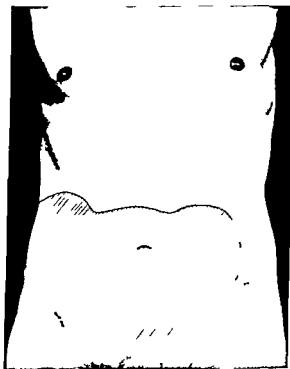at operation only adhesions and tubercles in some cases while

F g 195—Shaded area represents dulness in an extensive case of encap-
sulated tuberculous peritonitis Entire pelvis and lower abdomen filled with
fluid but walled off by agglutinated coils of intestine and omentum

in others in which the infection is a more virulent one instead
of miliary tubercles we find nodular masses in all stages of
caseation I will describe the pathologic changes and clinical
pictures together and discuss the diagnosis in conjunction with
these

1. *Ascitic or Free Fluid Type* (Fig. 196)—It was formerly taught that all cases of tuberculous peritonitis began in a slow, insidious manner. but further experience has shown that about one-third of the cases have an acute onset. The symptoms in such patients resemble greatly those affections which are of non-
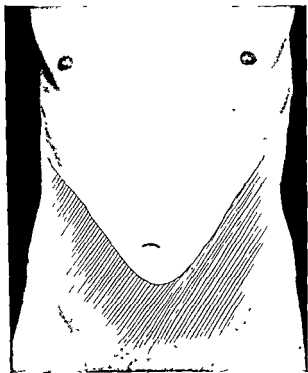

Fig 196—Shaded area of dulness in ascites when patient is lying on back. This area changes when patient assumes right or left lateral position

tuberculous nature and which are usually included under the head of acute abdominal conditions It is unnecessary for me to enumerate these, as I have discussed them in a previous lecture. In the cases of tuberculous peritonitis with acute onset there is a great resemblance to the ordinary pyogenic forms of infection In addition to the history of an acute onset without predisposing

symptoms we find high temperature high white blood count and pain of a localized or more diffuse character The pain when localized may be referred to the right iliac region or to the pelvis   In the former the primary focus in all probability has been of the ileocecal type to which I have referred earlier in my lecture   In the pelvic forms we encounter cases of acute salpingitis of tuberculous origin which resemble greatly the ordinary non tuberculous gonorrheal salpingitis   It is of interest in this connection to note that of 49 cases of tuberculous peritonitis observed in the clinic of Kummel 14 had an acute onset with high fever, of 10 cases of tuberculous salpingitis 5 began with acute symptoms and high fever

There is a second group which stands midway between the acute and chronic forms of tuberculous peritonitis and we might give it the name subacute because it begins in a little more insidious manner than the acute to which I have just referred   I have observed such a case which had been treated for typhoid fever for four weeks before being seen in consultation The onset had been gradual accompanied by malaise anorexia gradually increasing stupor tympanitic abdomen and fever of a continuous type resembling in every respect that of a typical case of typhoid fever   Examination of the abdomen showed the presence of free fluid and the Widal reaction being negative we operated and found a very severe form of *tuberculous peritonitis*

In introducing this subject of tuberculous peritonitis I have emphasized the fact that both from a pathologic and clinical standpoint it is at times impossible to definitely say that a case belongs in the free fluid adhesive or nodular type   It depends upon which one of the changes predominates and also upon the virulence of the tubercle bacillus the more fluid as a rule the less adhesion and vice versa   We can only distinguish the type of pathologic change clinically if one or the other of the characteristics of the various groups predominates   You must constantly be on your guard to avoid overlooking such a subacute or typhoid clinical form of tuberculous peritonitis as I have just described   *At operation in this case we found free fluid*

and many adhesions and again places where there was encapsulated purulent fluid and many nodular masses which had undergone caseation I mention these operative findings particularly to show you that a sharp separation of the three types is impossible in some cases

The clinical picture in the free fluid or ascitic cases which begin in a chronic manner is a very deceptive one and one should always be suspicious of the possibility of tuberculosis especially in young adults where free fluid appears in the peritoneal cavity without many prodromal symptoms In some cases there is slight discomfort or even pain in the abdomen but the most striking features are the gradual loss in strength and weight the pallor and the fact that the patient notes an increase in the size of the abdomen while there is a more general emaciation This paradox is one to be borne in mind in the examination of such cases It will hardly be necessary for me to tell you how to detect the presence of free fluid (Fig 194) The great difficulty at the bedside is that it is impossible to elicit the presence of free fluid until it has reached a fairly large amount This is the reason why so many cases especially in young people are overlooked Again it has been frequently observed clinically that the fluid disappears spontaneously and then recurs thus adding to the difficulties of diagnosis

In the differential diagnosis of cases of free fluid in the abdomen we must take into consideration the following (1) Cardiac decompensation (2) portal thrombosis from any cause (3) abscess of liver (if portal vein is compressed) (4) Bantis disease (5) chronic pancreatitis abscess or cancer of pancreas (6) cirrhosis of liver (7) Pick s disease (cardiac pseudocirrhosis polyserositis or perihepatitis fibrosa) (8) cancer and lues of peritoneum (9) non tuberculous diffuse peritonitis (either exudative or adhesive)

It is not advisable to make an exploratory puncture if the diagnosis can be made in any other way In connection with these cases of ascites do not overlook the frequently observed fact that cirrhosis of the liver is frequently accompanied by tuberculosis and again that hemorrhagic fluid means either

tuberculosis or neoplasm In differentiating between ascitic fluid and inflammatory exudate the following points are of chief importance Ascitic fluid as a rule does not contain more than ½ or 1 per cent albumin its specific gravity is 1012 to 1014 and the microscopic findings are practically negative In older cases however we can have a higher percentage of albumin, as high as 4 per cent even without inflammatory disturbances. In inflammatory exudates there is usually from 4 to 6 per cent albumin the specific gravity is 1018 or more and microscopically there is a predominance of lymphocytes and also a few endothelial cells There are few polymorphonuclear leukocytes and no red blood-corpuscles as a rule although as I have just stated if the fluid is hemorrhagic both to the naked eye and microscopically we must always suspect tuberculosis or neoplasm A hemorrhagic fluid in tuberculosis however is rather the exception than the rule

At operation in these cases of tuberculous peritonitis with free fluid we find the peritoneum much thickened and reddened and over its entire surface both visceral and parietal are scattered a great many miliary to hempseed sized grayish nodules. In severe cases these nodules may be so large as to resemble a carcinoma of the peritoneum and only microscopic examination of an excised nodule in the absence of finding a primary neoplasm will settle the diagnosis. As a rule the miliary nodules in carcinoma of the peritoneum are more whitish and more raised above the level of the serosa and larger than is the case in miliary tuberculosis In late cases there are many adhesions between the coils of intestine and also a rolling up of the omentum The free fluid is usually of a yellowish color clear and containing a few flocculi of fibrin but as I have just stated the fluid may be hemorrhagic and in 2 cases observed by Umber the fluid was observed at autopsy to be of a chylous character

2 The Encapsulated Form (Figs 193 193a)—This form of tuberculous peritonitis resembles in many respects an abdominal tumor especially is this true of encapsulated accumulations in the pelvis in the female where the differential diagnosis from ovarian cyst becomes at times very difficult

In these cases we may also have an acute onset (Figs 193, 195) The fluid may be of a serous hemorrhagic, or even of purulent character, and not infrequently a diagnosis is impossible before operation owing to the resemblance to other forms of abdominal tumor At operation we find many coils of small intestine plastered together, with enlargement of the mesenteric lymph nodes and a rolled up condition of the omentum   Between the
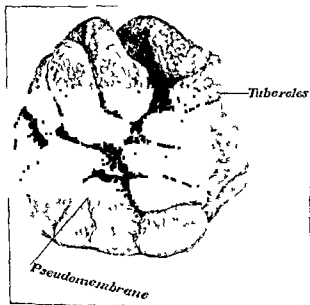

Tubercles

Pseudomembrane

Fig 197—Coils of intestine in a case of tuberculous peritonitis The label pseudomembrane leading to a cross shows how these false membranes bind the different coils of intestine to each other The serous surfaces of the various coils show innumerable tubercles covered by this false membrane

coils we find fluid and there may be one or more such encapsulated areas in the abdomen

3 *Adhesive or Nodular Type* —This type may be found in various stages according to the virulence of the organisms In the milder forms upon opening the abdomen we find the peritoneum uniformly studded with miliary tubercles while in the more severe cases the agglutinated tubercles with extensive

caseation combine with the agglutinated coils of intestine (Fig 197) and agglutinated adhesions of the omentum to form an almost inseparable mass

The clinical picture in the dry or adhesive (nodular) form is if anything more deceptive one than that of the ascitic or encapsulated forms As I have said before even in these cases there may be an acute onset There is gradual loss of strength and weight with increasing distention of the abdomen without evidences of free or encapsulated fluid Such a clinical picture should always make one suspicious of a possible tuberculous origin and a careful search should be made for evidences of a primary focus or intra abdominal primary foci

The prognosis of abdominal tuberculosis varies greatly with the severity of the original infection and whether or not it is possible to eliminate the primary focus This is especially true of tuberculosis of the cecum and appendix and of the ileocecal mesenteric nodes the tumor or stenosing type of small intestine tuberculosis, and of tuberculous salpingitis The outlook in cases of tuberculous peritonitis with free exudate is very good following operation but the same cannot be said for the other two forms An interesting paper has appeared from the Clinic of Kümmel by Kayser in regard to the end results in a series of 80 cases of various forms of abdominal tuberculosis as the result of operation Of 23 cases of tuberculous peritonitis with free fluid 10 died within the first year and 13 were alive and well at varying periods from one to thirteen years after operation It is interesting to note that 1 case showed a recurrence after eleven years of apparently good health Of 6 cases of encapsulated fluid 1 died three weeks after operation 1 could not be followed and 4 were well at varying periods of from nine to thirteen years Of the 51 cases of intestinal tuberculosis 11 died within the first few months 2 were in bad condition and only 7 recovered We thus see that the prognosis in the dry nodular or nodular type is not as favorable as in the other two forms and this is a matter of frequent clinical experience with all of us Of 13 cases of ileocecal tuberculosis 2 died immediately following operation, 1 after a month of unknown cause only 5 remained

permanently well   Of 3 cases of tuberculous appendicitis only 1 was well a year after operation   Of 10 cases of tuberculosis of the tubes 2 died of generalized tuberculosis within six months after operation I could not be traced and 7 were found well at intervals of from one and one half to thirteen years   Altogether there were 48 1 per cent of recoveries of which 35 8 per cent were found well from four and one half to fourteen years after operation so that they can be considered as cures   We thus see that although the prognosis is by no means as unfavorable as we have been led to think twenty years ago yet it is a serious disease and unfortunately all cases are not amenable to surgical interference or even non operative treatment

Treatment —It is impossible in a clinical lecture devoted to the entire subject of abdominal tuberculosis to take up in detail the treatment of each variety so I shall only attempt as I have previously done to give you a bird s-eye view of this portion of the subject

Cases of tuberculosis of the appendix with primary involvement of the mesenteric lymph nodes which begin suddenly like an acute appendicitis should be operated upon immediately At the same time that the appendix is removed an effort should be made to excise as many as possible of the adjacent nodular involved mesenteric lymph nodes because cases of secondary tuberculous peritonitis may be avoided in this manner

Ileocecal tuberculosis should be subjected to resection in preference to anastomosis if the former can be done   There are many cases however where the presence of dense adhesions and the advanced nature of the disease renders any surgical interference inadvisable

There is some difference of opinion in regard to the treatment of tuberculous salpingitis   The majority of surgeons however believe that salpingectomy is indicated   Some like Cerstens and myself are not in favor of such a radical measure in every case as it is best to conserve the tube for the purpose of future pregnancies as has been done successfully

The only form of tuberculous peritonitis in which operation is always indicated is the ascitic or free fluid form   The same

ls true of the encapsulated form in fact for the purpose of *evacuating the fluid if it can be accurately localized*

If the dry or adhesive (nodular) form of tuberculous peritonitis should be operated upon through an error in diagnosis it is inadvisable to attempt any separation of the adhesions or removal of the nodular masses

The tumor like form of intestinal tuberculosis is subject to the same treatment as the ileocecal form of tuberculosis namely resection if possible

The primary forms of mesenteric node tuberculosis whether of an acute or chronic form are best treated by removal of all accessible nodes if this can be safely done This is especially true of the ileocolic group of nodes less so as one advances toward the root of the mesentery

The general tendency in abdominal tuberculosis with the exception of the above instances has been toward conservatism following the excellent results obtained by Rollier Bircher Hinsdale and others through the use of helio- and x ray therapy Tuberculin has been discarded as being dangerous both as a diagnostic and therapeutic measure

It has been impossible in this clinical lecture to cover every phase of this vast subject but I trust at least that I have caused you to think of abdominal tuberculosis as a whole and not to labor under the former opinion that tuberculous peritonitis constituted practically the only form of abdominal tuberculosis.

CLINIC OF DR GEORGE E SHAMBAUGH

PRESBYTERIAN HOSPITAL

MALIGNANT TUMOR AT THE UPPER END OF THE ESOPHAGUS

Summary Diagnosis Treatment largely palliative Folly of tonsillectomy in absence of proper indications

THIS woman is sixty two years of age She consulted me for the first time on October 28, 1919

The one symptom which was causing annoyance was difficulty in swallowing This she had noticed since May, 1919 She had very little complaint about discomfort or pain Five weeks previous to seeing me she had had her tonsils removed The patient appeared weak and stated that she had undergone decided loss in weight since last May

Nasal conditions were found to be normal The epipharynx and the oropharynx were normal On depressing the tongue nothing abnormal was detected in the hypopharynx By means of the laryngeal mirror it was possible to exclude any laryngeal involvement Vocal cords were normal and their action was unimpaired Just back of the larynx at the beginning of the esophagus one recognized by means of the laryngeal mirror an irregular mass, projecting upward This was located more toward the left side The surface of the mass was somewhat irregular, with no distinct inflammatory reaction involving the mucous membrane and no evidence of ulceration When the patient inspired deeply so as to dilate the rima glottis the upper end of the tumor tended to drop over between the arytenoid cartilages On phonation the tumor receded again into the hypopharynx and the cords approximated normally

A cancer in this locality is not very uncommon One can usually recognize the presence of the condition by the use of the

laryngeal mirror Even in cases where the tumor does not
project into the hypopharynx an edematous swelling of the
mucous membrane just back of the larynx at the beginning of
the esophagus, appears rather early Operative treatment
directed for the removal of the tumor is not very satisfactory
for obvious reasons Its removal is rather difficult without at
the same time removing the larynx, and palliative measures,
such as gastric fistula for feeding purposes is often all that one
seems justified in carrying out

This case illustrates a situation which is all too common at
present It is the tendency to blame all sorts of conditions
upon tonsils The fact that chronic infection of the tonsil is
now recognized as a distinct menace and as the cause for various
types of systemic infection seems to have brought about rather a
hazy conception in the minds of many practitioners as to the
conditions which can be reasonably blamed upon tonsil infection.
The indiscriminate removal of the faucial tonsils is deprecated
by everyone who is interested in nose and throat work and the
question as to whether the tonsils require removal in a particular
case frequently calls for very careful discrimination It is a
mistake to teach practitioners of medicine the technic of operating
on the tonsils without teaching them first the more difficult
problems in diagnosing those conditions which justify a tonsil
operation There is nothing in this patient's symptoms which
suggested any tonsil trouble Her one annoyance was difficulty
in swallowing The only tonsil trouble which would bring out
this symptom is an acute infection such as an acute follicular
tonsillitis a peritonsillar abscess or a malignant tumor of the
tonsils None of these conditions had been present in this case
Apparently the tonsils were removed on the principle that where
one discovers no palpable evidence of other trouble take out the
tonsils It is very evident that this is a wrong principle Such
a view naturally brings suspicion on the question of tonsil opera-
tions just as the indiscriminate removal of the ovaries previously
practised by gynecologists brought into suspicion much of the
work which was being done by these surgeons

ENCEPHALITIS WITH PARALYSIS OF SOFT PALATE AND ESOPHAGUS

Summary Diagnosis—differentiation from postpharyngeal abscess Nasal feeding—precautions to be observed

This boy, aged seven years, was brought to the Presbyterian Hospital October 5, 1919 with a diagnosis of postpharyngeal abscess, which had been made because of the symptom of difficult swallowing associated with the accumulation of mucus in the pharynx, which the patient had difficulty in expectorating

The patient's illness had come on rather suddenly three days before, when he was found to have a temperature of 102° F and was unable to swallow He complained of headache There seemed to be a little stiffness of the neck at least asleep Movement of the head caused some discomfort The following day the physician in charge thought that the symptom of secretion in the throat was more marked and that there was an odor to the breath which resembled that from pus The following day the patient began to become more or less somnolent still complained of headache, and was not able to swallow

The patient was then brought to the Presbyterian Hospital I was expecting, from his symptoms to find some palpable evidence of obstruction in the hypopharynx The boy was lying quite still, with his eyes closed apparently half asleep When addressed sharply he could be aroused enough to make an intelligent reply, stating his age and where he lived His voice had the characteristic sound caused by paralysis of the soft palate such as we meet with in postdiphtherial paralysis When bringing the patient to the hospital he had experienced several choking attacks, due to difficulty in clearing the accumulation of mucus from the larynx

Examination disclosed no evidence of infection or infiltration in any part of the pharynx By means of the laryngeal mirror

the larynx was found obscured by an accumulation of ropy mucus. That there was no involvement of the vocal cords themselves was apparent even though inspection of the cords was obscured by the accumulation of mucus In the first place the patient experienced no difficulty in breathing except at times when there was an excessive accumulation of mucus and in the second place there was no element of hoarseness in the voice which could be attributed to laryngeal involvement I did not feel that we were able to exclude the possibility of a foreign body lodging in the upper part of the esophagus causing the difficulty in swallowing the accumulation of secretion and giving rise to the elevation in temperature

The shagraph disclosed no evidence of any foreign body and no disease of the cervical vertebræ Examination of the spinal fluid showed that there was increased pressure not such however as one finds associated with epidemic cerebrospinal meningitis There was a decided increase in the cell count. The fluid was sterile There was a slightly developed Kernig. The head was thrown back slightly but there was no very marked rigidity The Wassermann made on the spinal fluid was negative Examination of the blood showed a moderately increased white count, varying from 12 000 to 24 000 The temperature for the first two weeks ranged from 99° to 101° F After that it gradually subsided and became normal in a few weeks When his symptoms were the most marked he was examined by Dr Bassoe who reports the neurologic findings as follows Moves eyes in all directions and shuts them firmly tongue protruded well and raises soft palate a little deep reflexes absent bilateral Babinski abdominal reflexes present but weak slight Kernig sign flexion of neck resisted speech unintelligible thick can be aroused but drops to sleep again The condition was evidently one of encephalitis with paralysis of the soft palate and the esophagus Since the patient was not able to swallow feeding was carried on by means of a nasal tube that is a soft rubber catheter was passed through the nose until it had passed the opening of the larynx This position was ascertained by placing the tip of the tube in a tumbler of water when on ex

piring if the tube was in the larynx, air would cause bubbling This precaution had to be observed so as not to take any risk of throwing the food into the trachea Proper nourishment could be administered in this way. It was several weeks before the patient was able to take nourishment by the mouth When the patient left the hospital he was feeling very well and the only symptom which persisted was impairment of the voice resulting from the persisting paralysis of the soft palate

the larynx was found obscured by an accumulation of ropy mucus. That there was no involvement of the vocal cords themselves was apparent, even though inspection of the cords was obscured by the accumulation of mucus. In the first place the patient experienced no difficulty in breathing except at times when there was an excessive accumulation of mucus and in the second place there was no element of hoarseness in the voice which could be attributed to laryngeal involvement. I did not feel that we were able to exclude the possibility of a foreign body lodging in the upper part of the esophagus causing the difficulty in swallowing the accumulation of secretion and giving rise to the elevation in temperature.

The skiagraph disclosed no evidence of any foreign body and no disease of the cervical vertebræ. Examination of the spinal fluid showed that there was increased pressure not such however as one finds associated with epidemic cerebrospinal meningitis. There was a decided increase in the cell count. The fluid was sterile. There was a slightly developed Kernig. The head was thrown back slightly but there was no very marked rigidity. The Wassermann made on the spinal fluid was negative. Examination of the blood showed a moderately increased white count varying from 12 000 to 24 000. The temperature for the first two weeks ranged from 99° to 101° F. After that it gradually subsided and became normal in a few weeks. When his symptoms were the most marked he was examined by Dr Bassoe who reports the neurologic findings as follows 'Moves eyes in all directions and shuts them firmly tongue protruded well and raises soft palate a little deep reflexes absent bilateral Babinski abdominal reflexes present but weak slight Kernig sign flexion of neck resisted speech unintelligible thick can be aroused but drops to sleep again' The condition was evidently one of encephalitis with paralysis of the soft palate and the esophagus. Since the patient was not able to swallow feeding was carried on by means of a nasal tube that is a soft rubber catheter was passed through the nose until it had passed the opening of the larynx. This position was ascertained by placing the tip of the tube in a tumbler of water when on ex

NASAL OBSTRUCTION SIMULATING PERSISTING HEAD COLDS

Summary A child presenting a history of frequent sneezing attacks associated with an abundant secretion of thin mucus from the nose   Diagnosis   Unnecessary operations and the half baked specialist

This child was brought to me in 1913, when he was two and a half years old, with history of symptoms of continuous nasal obstruction, which dated practically from birth   There was a great deal of watery mucous discharge from the nose and frequent sneezing attacks   There was no history of attacks of tonsil litis nor were there any ear symptoms

Examination disclosed normal drum membranes   The tonsils were small and there was no evidence of chronic infection   There was no enlargement of pharyngeal tonsils   The nasal passages were quite small   The middle turbinate body, on either side was wedged in tightly between the septum and the outer wall of the nose   a condition with which we meet not infrequently in adults   especially in cases where the patient is troubled by the symptoms complained of here   sneezing attacks   increased nasal secretions and nasal obstruction   simulating very closely the reaction associated with hay fever   but differing from the latter in the fact that the symptoms persist throughout the year and may even be more troublesome in winter than in summer

I am reporting the case because it illustrates the situation too frequently met with in these days   when there is no regulation regarding requirements for entrance into the practice of specialties   The child is still having the same type of symptoms as when I first saw him   and examination of the nose still discloses the same anatomic situation resulting in obstructed ventilation of the ethmoid   One interesting feature about this case is that the child has been subjected to two operations on the adenoids and one on the tonsils since I first saw him, although there has never been

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any history of tonsillitis or any symptoms suggesting trouble from this source

The condition that presents itself in the child's nose is one which in adults we can very often relieve by resection of the middle turbinate bodies I do not believe, however that such an operation in the nose should be undertaken in children where there is no evidence of pus infection When the child gets a little older, if symptoms are still persisting, one may be able to carry out this procedure under local anesthesia

ASTHMA CURED BY OPERATION IN NOSE

Summary Demonstration of patient four years after exenterat on of ethmoid because of recurrent head colds and asthma Primary diagnos s method of treatment and results to date

THE case is that of a man aged thirty nine, who consulted me first in February 1916 complaining of frequent attacks of acute head cold nasal obstruction involving both sides sneezing attacks associated with profuse watery discharge from nose, and severe paroxysms of asthma The head colds and the alternating nasal obstruction he dated back at least five years The asthma followed acute infection which he contracted August 14, 1914 At that time he had a chill followed by a temperature of 104° F Four or five days later he developed coughing and asthma He states it was five or six weeks before fever entirely disappeared and up to the time he saw me in 1916 he had more or less continuous asthma with severe exacerba tions, except for short periods when in Arizona So severe were the paroxysms that he was often obliged to sit up an entire night

On examining his nose I found that the septum was irregular, deflected in front to the left and above and behind this to the right On both sides inspection of the ethmoid was difficult even under cocain On the left side it was possible to recognize small polypi appearing under the free edge of the middle tur binate body The situation here was one of hyperplastic eth moiditis a condition frequently found associated with symptoms which are commonly called reflex such as sneezing attacks and asthma

It was not possible to operate on the ethmoid without first correcting the nasal septum The operation was undertaken four days after first seeing him The nasal passages were cocainized by carefully placing along both sides of the septum thin pledgets of cotton which had been saturated with a solution of 5 per cent cocain made up in 1 1000 adrenalin Care was taken to cocainize

the ethmoid region as thoroughly as possible by pushing small pledgets of cotton saturated with cocain against the free edge of the middle turbinate body   The operation was carried out with the patient lying down on the operating table with the head elevated   We find this much preferable to a sitting position especially for such operations as submucous resections of the septum which often require consideration of the septum   In this case after correcting the septum we had no difficulty in getting a satisfactory view of the ethmoid region, and the usual operation for exenteration of the ethmoid was carried out   This means first of all the resection of the middle turbinate body   We find this most readily accomplished by the Andrews knife which cuts through the anterior part of its attachment   A wire snare is then passed over the partially detached portion and the turbinate body is pulled away from its attachment   With this accomplished it was but the work of a few seconds to complete the exenteration of the ethmoid labyrinth by using suitable nasal forceps   We were able in this case to carry this out for both sides of the nose   The ethmoid was found filled with mucous polypi

Almost immediately after operation the patient experienced a return of the sense of smell of which he had been deprived for some time

When he was seen by me in September 1916 he reported his condition as very much improved   Since that time there has been no return of asthma and examination of the nose shows that the ethmoid region has remained free from polypi

PERSISTENT MASTOID FISTULA AFTER SIMPLE MAS-
TOID EXENTERATION

Summary Cause of persistent postoperative mastoid fistulæ   Diagnosis
Method of closure

THIS patient consulted me October, 1919   She was a woman
twenty four years of age, who had undergone a bilateral mastoid
operation, which had been undertaken four days after the onset
of an acute otitis media

It was evident from the size of the scar that rather an exten
sive exenteration was carried out   On the left side the scar over
the mastoid is depressed and the opening into the antrum is
closed by a very thin delicate membrane   This membrane is so
delicate that there is a slight superficial erosion going on over the
outer layer but there is no opening into the antrum   On the
right side there is presented a depressed scar in the mastoid
opening and a fistula fully $\frac{1}{2}$ inch in diameter opening directly
into the antrum   There is no active discharge but the patient
was very much annoyed and worried over the condition of both
ears and had the impression that further mastoid operations
would have to be undertaken before the disease in the mastoid
would be eradicated   The drum membrane on both sides is
practically normal and the hearing for the whispered voice was
normal in both ears

The persistence of a postauricular fistula after the completion
of a radical mastoid operation is not uncommon in cases where
the situation uncovered at the time of the operation did not permit
of a primary closure of the incision over the mastoid and where
the dressings were carried out over a long period by introducing
the gauze through the mastoid opening   It is much less common
to meet with the persistence of a mastoid opening after a simple
mastoid exenteration such as one carries out for the relief of
mastoiditis developing in connection with acute otitis media
I have never had this experience in any case which I have operated

on myself but I have observed it several times in patients who had been operated elsewhere It has been my impression that the chief factor in developing the permanent fistula has been too persistent packing of the mastoid opening The simple mastoid operation as we do it now makes a closure of the incision over the mastoid with the exception of only a small place which is left more for drainage than for packing The persistence of an open fistula after a simple mastoid operation is often misinterpreted as signifying some deep seated involvement of the bone which is keeping the fistula open I have seen this mistake made in several cases where the impression of the existence of carious bone was emphasized by the surgeon introducing the probe and discovering what he thought was a sensation of roughened bone As a matter of fact this sensation can be produced by introducing the probe in any of these cases where there is a persisting opening the reason being that the covering of the bone in the antrum is but a very delicate thin membrane The persistence of a diseased bone can be recognized by the persistence of a purulent discharge from the ear A mucous discharge which is not purulent is not characteristic of a disease of the underlying bone but means rather the continuation of a catarrhal condition in the antrum aditus and tympanum

The treatment for the closure of a persisting mastoid fistula whether this occurs as a sequel of a radical or a simple mastoid operation is the same Under either a local or general anesthesia a spindle shaped incision is made somewhat within the outer rim of the depression (Fig 198 1) The membrane covering the deeper part of the mastoid opening is then dissected free so that it can be turned in and sutured bringing the outer surface on the inner side (Fig 198 2) The skin external to the primary incision is then elevated sufficiently to permit of a coaptation of the opening (Fig 198 3 4) In this way two layers cover the opening and I have never had any difficulty in securing a permanent closure by this simple method

ACUTE OTITIS MEDIA IN AN INFANT WITH ACUTE SWELLING BACK OF THE EAR

Summary Diagnosis and treatment Pathologic anatomy of postaural swellings in infants with otitis media—the two types—indications in each—precautions to be observed in operative procedures

In December, 1919 a child six months old was brought to me because the mother had discovered that morning the development of a swelling back of the right ear The mother did not think the child was ill but, on making inquiry she stated that she had noticed the baby had been more fretful than usual for perhaps a week She was beginning to suspect that there might be some trouble in the ears because she had noticed the child had developed a tendency to bore in the ear with its fist She had not taken the temperature but for several days had noticed the child at times felt feverish The patient did not present the appearance of being very ill

Back of the right ear was found a distinct infiltration with congestion of the skin The infiltration caused the auricle to stand out perceptibly from the side of the head The picture was that characteristic of periostitis developed in the course of acute mastoiditis

An examination of the ears disclosed that there was acute otitis media in both ears Both drum membranes were bulging very perceptibly The appearance of the drum membranes was somewhat different from what one often sees in these acute cases The membrane had a whitish or yellowish color for the most part instead of the bright red color which is so character istic of the membrana tympani in cases of acute otitis media The landmarks were obscured The processus brevis and handle of the hammer were faintly discernible The peculiar yellowish color of the drum membrane was due to an accumulation of pus in the tympanic cavity The temperature was 102° F.

brane has been established   In those cases where this periostitis goes on to the formation of a subperosteal abscess the simple Wilde s incision that is an incision parallel with the attachment of the auricle over the swollen region cutting through the periosteum is all that is necessary to bring about prompt cure since there is no disease of the bone but only an extension of the infection from the antrum through the patulous petrosquamosal suture to the periosteum   The other type of case that is where the periostitis back of the ear develops some time after the discharge through the drum membrane has been established requires something more than Wilde s incision   In these cases as well as in some of the cases where periostitis develops before the drainage from the tympanum has been established the sub periosteal abscess is dependent upon the extension of infection by softening of the bone covering the outer wall of the antrum   A simple Wilde s incision is not sufficient in these cases   It is necessary to remove the diseased bone with a curet   This operation is simple as compared with the operation for an acute mastoiditis occurring in an adult   However the chances of doing harm by operation are as great as in the adult   In the first place the absence of a mastoid process leaves the opening through which the facial nerve escapes exposed over the surface of the bone back of the ear   In making a simple incision through the periosteum it is a very simple matter to cut the facial nerve   In the second place when attempting to remove the softened bone by means of a curet it is important that one recognize the different anatomic relations existing in an infant from those found in the adult otherwise the operation may very easily result in injury to important anatomic structures such as the horizontal semicircular canal the lateral sinus and the facial nerve where this courses through the temporal bone

Both drum membranes were incised by making a cut along
the posterior border of the handle of the hammer far enough
away so as not to run the risk of cutting into this bone   This
incision was carried to the floor of the tympanum   A distinctly
purulent secretion protruded into the opening

The only further treatment instituted was regular cleansing
of the canal three times a day with dry pledgets of cotton, and
the placing into the canal of a wick like tuft of cotton which was
changed whenever it became moist   Within three days the
temperature had dropped to normal and the swelling back of the
ear had entirely disappeared

The case illustrates a not uncommon occurrence especially
in children under one year of age where the development of
periostitis back of the ear is not due to any softening of the bone
but is caused by the extension of infection through the petro-
squamosal suture, which passes directly through the outer wall
of the antrum   There is no mastoid process in an infant at
birth and of course no mastoid cells   The middle ear consists
of the tympanic cavity, the aditus and the antrum in reality
two large chambers with only a slightly constricted communicat-
ing passage—the aditus

In cases of acute otitis media where there is not prompt
drainage through perforation of the drum membrane it happens
very readily that the infection from the antrum extends to the
periosteum over the mastoid region by means of the blood vessel
and lymphatic communications which pass through the patulous
petrosquamosal suture

The significance of a reaction back of the ear therefore
which occurs in a young child before the drum membrane ruptures
is not the same as where this reaction develops after the ear has
been discharging for a week or more   The latter condition
usually indicates extension to the periosteum by softening of the
outer wall of the antrum

The operative treatment for the two conditions is also quite
different.   In the first place where periostitis develops before
rupture of the drum membrane in the majority of instances this
will subside promptly after the drainage through the drum mem

CLINIC OF DR GATEWOOD

Presbyterian Hospital

TUBERCULOUS GLANDS OF THE NECK

Summary Etiology and surgical pathology of tuberculous cervical lymphadenitis Frequency of infection by tubercle bacilli of the bovine type—remarkable coincidence of decrease in number of cases of tuberculous glands of neck with improvement in milk supply Treatment—radical operation becoming obsolete—good hygiene removal of possible primary foci in mouth and throat local evacuation of cold abscesses and *x* ray the present methods of cure

This patient is a maid in the hospital She is twenty three years old and gives the following history She has always been well until about three or four months ago when she noticed a swelling on the right side of her neck This was not painful It gradually increased in size At first it was hard but it eventually softened and was opened by a physician allowing a considerable quantity of yellowish pus to escape Following this the lesion healed almost by primary union She now returns with two discrete swellings in the neck The upper one lies immediately beneath the scar of the former incision and distinctly gives a sense of fluctuation The second one is located about 3 cm below the first and is quite firm It can be readily moved and is not adherent to the skin (Fig 199) Its location is that of a deep cervical gland There is no redness of the overlying skin Examination of the throat shows that her tonsils have been removed There is no evidence of infection in the mouth nose or ears There are no palpable glands on the left side of the neck or other swellings on the right side Her general condition is excellent She has had no elevation of temperature during the short period we have had her under observation and the internists state that they have

glycerin emulsion and closure of the wound By this method primary union is obtained in many instances More recently some surgeons have been treating selected cases in the same manner as contaminated wounds, dissecting out, when possible, the entire infected area and closing immediately That is what I shall endeavor to do in this case In addition, I am swabbing out the entire field with iodoform emulsion, not so much for its antiseptic properties, as for its stimulating action upon the tissues It is important, I think, to have perfect hemostasis and to close the wound accurately in order to eliminate all dead space We shall probably obtain primary union, but should infection occur we have lost nothing

This is an example of the type of tuberculous glands of the neck which we frequently see today A number of just such cases may be seen in our dispensary almost any day Most of them occur in patients somewhat younger than the one upon whom I have just operated, and though tuberculous lymphadenitis is primarily a disease of childhood and adolescence, it may appear at any age The Boston Board of Health found 13,711 cases of enlarged glands of the neck in examining 118,781 school children (11 6 per cent) Others have found them in a much larger percentage of children This naturally does not mean that all young patients with chronically enlarged glands have tuberculosis, although it must always be considered as a possibility Hawes,[2] in reviewing the treatment of tuberculous glands of the neck as carried out at the Massachusetts General Hospital, states that he believes that any chronic adenitis of more than three months' duration should be considered as tuberculous and treated as such The development of the disease may be rapid or slow, depending upon the susceptibility of the individual and the extent of the pulmonary involvement already present The infection may begin at either end of the chain though by far the greatest number appear first in the submaxillary region G B Wood[1] pointed out that the tonsils drain into the superior cervical glands, especially into the one lying under the anterior border of the sternomastoid, just behind the angle of the mandible Much light has been thrown upon the method of invasion of the cervical

been unable to find any evidence of pulmonary disease In
spite of these facts she almost surely has tuberculous glands
of the neck, and it is with that diagnosis we are operating

Under gas anesthesia I am making an incision parallel to the
anterior border of the sternomastoid muscle dissecting out the
old scar I have opened into an abscess cavity which contains
about 2 drams of creamy pus There are some flocculi in this

Fig 199 —Small tuberculous glands of neck

pus making the diagnosis of tuberculo is more certain I can
find but a single large gland below this abcess Extending
my incision downward I am removing this firm smooth gland
about which there is very little peridenitis What shall we do
with the cavity? There are two procedures to be considered
The first which has been standard for many years is to curet
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Chronic non tuberculous adenitis is frequently found following acute tonsilitis and as a result of otitis media and other infections about the head especially those due to pediculosis capitis In the early stage I know of no absolute method of differentiating them clinically and only time will settle the diagnosis Both are non adherent to the skin and both are discrete There is no doubt that many non tuberculous glands do become tuberculous later on The treatment is the same in both cases that is to remove all possible sources of infection and give the patient the benefit of the best hygienic surroundings The non tuberculous glands will usually rapidly decrease in size under this management although small hard nodules are apt to persist for a long time

Syphilis rarely offers great difficulty in differentiation as the glandular involvement is either a part of the general aden opathy of a secondary lues or of the acute adenitis of an extra genital chancre Careful physical examination will usually render the diagnosis easy

Enlarged cervical glands as a part of the picture of leukemia are not uncommon The picture of generalized adenopathy with freely movable glands and the characteristic blood findings excludes tuberculosis very readily except in the conceivable cases in which both might be present simultaneously

Of the malignancies Hodgkin s disease is the most frequent perhaps and the most difficult to differentiate especially in that variety beginning in the neck and not showing general adenopathy for a considerable time The blood picture though suggestive is not characteristic enough in either case to be of determining value In Hodgkin s disease the glands do not break down but remain discrete while in hyperplastic tuberculous adenitis the glands may remain firm discrete and fairly movable for a long time In such cases the microscope must make the final diag nosis While pathologists are trying to differentiate between Hodgkin s disease and lymphosarcoma we shall pass on to other malignancies since clinically we are unable to separate them

glands by experimental work upon animals It has been shown repeatedly that the epithelium of the tonsil may be penetrated by tubercle bacilli without leaving any marks or evidence of such invasion Wood in his experiments upon hogs found that tubercle bacilli inoculated on the surface of the tonsil were carried into the gland and that on the fifth day they could be demonstrated in the 'tonsillar lymph gland in the neck Cornet in 1914 fed large quantities of infectious material to various animals and found that the cervical glands became infected in almost every case through the mucous membrane of the tonsil Griffith fed 92 animals and found tuberculosis in the tonsils in 23 instances while the cervical glands were involved in 50 of his animals While there can be no doubt that the tonsil is one of the most important portals of infection for the development of tuberculous cervical lymphadenitis other sources such as infections of the teeth tongue and salivary glands must be thought of in considering the treatment.

Although the type of organism makes but little difference in the course of this disease of interest is the fact that the bovine type predominates in children while the human variety is much more frequent in adults A S Griffith[4] made a careful bacteriologic study of cervical and axillary tuberculous lymph nodes in 52 patients He found that in children under ten years of age 72 per cent of the infections were of the bovine type between the ages of ten and twenty one-third were of the bovine type of infections developing in patients over twenty years of age only one-fifth were of the bovine type.

In cases which have broken down with the development of abscesses there is apt to be a secondary infection due to the staphylococcus It is in the attempt to avoid this complication that I have operated upon this patient though there are surgeons today who maintain that these cases should be allowed to open spontaneously because even broken-down glands occasionally are absorbed without going on to sinus formation

In this case with a cold abscess and a chronic inflammatory process there has been no difficulty in making a diagnosis as there is little else to consider Oftimes however one must

think of other chronic enlargements due to pus organisms as well as syphilis leukemia and malignancies

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The picture in metastatic carcinoma of the cervical gland, has little in common with tuberculosis. The presence of a primary tumor of the tongue palate or lip makes the diagnosis self evident. The frozen in sensation upon palpation is usually so definite that it is difficult to mistake it for anything else although I have seen a case of primary carcinoma of the naso-pharynx occurring in a man twenty three years old who was operated upon twice with the mistaken diagnosis of tuberculous cervical adenitis. The small primary tumor was not discovered until some months later. In case any doubt exists one should never hesitate to remove the gland under local anesthesia and to make a careful microscopic diagnosis before undertaking any radical surgical procedure.

Treatment—The treatment of tuberculous cervical lymph adenitis depends upon many factors although there are some fundamental principles which are common to the management of all cases. If asked as to the relative value of the various therapeutic measures I should put them in the following order 1 The first and by far the most important is general hygiene. Although some of the patients we see seem to be in the best of health otherwise the establishment of regular sleeping hours increasing the out-of-doors hours and the employment of heliotherapy will often mark the beginning of rapid and per manent improvement. Regardless of what other measures may be employed hygienic measures must be considered of prime importance and other measures merely as adjuncts. In addition to proper diet climate rest etc attention must be given in certain cases to proper occupations.

Of foremost importance in the diet is the question of the milk supply. Most of the milk now used in the cities and larger towns is pasteurized. Griffith s work demonstrated conclusively that in England and Scotland at least a great majority of the cases in children were of the bovine type. In discussing the matter recently with Dr C H Mayo he told me that from a certain district in Wisconsin many cases of tuberculous cervical lymph adenitis formerly came to their clinic. Since the testing of cattle has become so general they have not had a single case

from that particular district although the number of surgical cases coming from that locality is on the increase

2 Next in importance although usually the first measure in point of time is the removal of all possible sources of infection such as bad teeth bad tonsils and nose infections This is important not only from the standpoint of preventing further tuberculosis but also in avoiding secondary involvements in already infected glands

3 Operative measures probably come third in order of importance although some of my x ray colleagues may disagree with me in this I have not seen a radical resection of glands of the neck for tuberculosis in two or three years but I can recall the time only a few years ago when there was scarcely a day but some surgeon in this hospital was doing a radical operation for this condition The reasons for the change are several In the first place we do not see anything like the number of cases we formerly did of great bilateral swellings in the neck Then those cases we do see are usually of the type I have shown you this morning that is with only a few glands involved on one or both sides Part of this may be laid to the massacre of the tonsils and part to improved general hygienic conditions I th nk h   difference

lymph adenitis in children should be treated conservatively because so many got well without operation or by merely opening the abscesses when present This treatment finally has been amplified to include adults as well so that now a fairly rational basis for operation has been established

Indications for operation should depend then upon the degree of infection and its duration the size of the glands involved whether or not they are broken down and upon the surgical skill available The financial condition of the patient must also be considered as operation is advisable in some cases where prolonged treatment would be a financial hardship In such instances especially where one can be reasonably certain that the patient will not carry out any medical management advised

operation is resorted to in the hope that after a definite propor tion of the patient's tuberculosis has been removed, his resistance will be sufficient to overcome the remaining foci For example let the patient's resistance arbitrarily be placed at 70 points his pulmonary lesion at 50 points, and his neck lesion at 30 points. Removal of three-eighths of his infection would permit his resistance (70 points) to overcome the remaining infection (50 points)

The time for operation is always a difficult question to decide although I believe that in general fluctuating abscesses should be treated either as we have done this morning or where this is not feasible, by drainage under local anesthesia All caseating glands should be removed if they do not react promptly to other measures although this operation is rarely necessary One must always remember that generalized tuberculosis is apt to follow such an operation and death from acute pulmonary tuberculosis is not rare despite relatively few lung findings prior to operation. Out of 692 operative cases observed in the Berne Hospital 29 per cent eventually showed the disease in the lungs intestines kidneys, or meninges. Any extensive operation of this sort demands a good operator although too often delegated to some inexperienced member of the house staff

The anesthetic of choice is novocain but its use is unfortu nately, out of the question in cases of extensive involvement Where gas can be used as in the present case it is to be preferred as a general anesthetic When a long radical operation is under taken ether has usually been employed but as pulmonary complications are quite apt to follow its use the amount should be reduced to a minimum by a good anesthetist and a good operator

4 As a fourth therapeutic means at our disposal and one whose value has been frequently overlooked we have the x ray Russell H Boggs[a] reported 500 cases nearly all of which were cured by this means and he thinks that over 90 per cent may be cured if properly treated Bonine says that surgical treat ment is contraindicated in every case The x ray acts by ar rhosing the glands going on to entire obliteration of the adenoid

tissue although it can leave behind small hard, and frequently calcifying nodules I have seen roentgenography used in a number of cases in which the glands were large and hard with very satisfactory results My limited experience with broken down glands treated with the x ray would not warrant me in advising it until after operative measures had been carried out

5 Lastly, I may mention tuberculin I have used it in but a few cases and have never been much impressed with its value as a therapeutic measure in this type of infection Hawes employed it in 500 cases at the Massachusetts General Hospital and seemed to think that in certain cases it was of decided benefit but he was by no means enthusiastic in its support While I am aware that some men are still strongly advocating its use, I believe that the use of tuberculin in lymphadenitis cases will eventually be discontinued

In this brief sketch of the treatment as I see it today I have not considered any medicinal agents such as iodin or some of its salts, which had quite a vogue at one time By placing more emphasis on the early removal of all possible sources of infection both focal and environmental and by the institution of proper hygienic measures including the use of the proper sort of milk tuberculous lymphadenitis will gradually cease to be a surgical disease just as the radical operation is rapidly becoming obsolete In the meantime I feel that we should give careful individual consideration to each case before determining which of the therapeutic measures I have outlined should be employed

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CONTRIBUTION BY DR ROY L MOODIE

Department of Anatomy, University of Illinois, College of
Medicine

THE ANTIQUITY OF POTT'S DISEASE AND OTHER SPINAL LESIONS; PRIMITIVE TREATMENT

Summary Origin of tuberculosis unknown   Pott's disease first indicated in
a Neolithic (5000 B C) skeleton from He delberg where it attacked the
upper dorsal vertebræ   The first psoas abscess associated with necrosis
of lumbar vertebræ seen in the mummy of an ancient Egyptian priest
(XXIst Dynasty 1000 B C)   Scholios s in the skeleton of a fourteen
is suggested by a bark corset with eyelets for lacing

THE antiquity of tuberculosis, at least in one of its phases
is indicated by the condition seen in ancient skeletons and mum
mies dating from about 5000 B C to the present time   Of
the ultimate origin of this dread disease paleopathology tells
us nothing although tuberculosis has been diagnosed as the
cause of certain lesions among fossil tertiary mammals   Tuber
culous conditions of the spine vertebral caries or Pott's disease
are frequently and necessarily confused with spondylitis de
formans, traumatic spondylitis and other vertebral affections
The diagnosis of a lesion on a dry skeleton as the result of a
certain disease is beset with uncertainties   At the most
ancient lesions can only be said to be strongly suggestive of
certain pathologic processes   In only one case of the many
assigned to Pott's disease in ancient times has it been possible
to recover evidences which definitely identify the disease

The five examples of spinal disease described herewith repre
sent a wide range of time and space and indicate an antiquity
for spinal deformations which if we could find the material
would doubtless be as old as the human race itself and indeed, for

we know of examples of spondylitis extending back among the
dinosaurs to an antiquity of 25,000 000 years or more The
following tabulation gives the approximate time and locality
of each example They do not all represent Pott s disease but
are worthy of description in this connection

1 Neolithic Heidelberg (Late Stone Age)—ascribed to
Pott s disease by Bartels Age About 5000 B C

2 Ancient Egypt (XXIst Dynasty)—ascribed to Pott s dis-
ease by Smith and Ruffer Age 1000 B C

Figs 200 201—Right and left views of the upper dorsal vertebræ of a
young man of the Neol thic period (5000 B C) found near Heidelberg and
regarded by Bartels as indicative of the oldest case of Pott s disease The
symbols (R2 etc) refer to the costal articular facets The Roman numerals
indicate the pos tion of the vertebræ in the th rac c series The kypho s is
quite evident (After Bartels)

3 Merovingian Cemetery in Weimar—suggestive of Pott s
disease in the Skoliosis sin stra by Pfeiffer—fourteen year-old
girl Age 500 B C

4 Pre Columbian North American Indian—hypertrophic
spondyl tis and necrosis Age 1400 A D (?)

5 North American Indian (Pre Columb an?)—Lumbar
Necrosis—(tubercular?) Age doubtful (500 years old?)

The Neolithic skeleton that of a young man about twenty or twenty five was found in a grave[1] of proved Neolithic age (3000 to 7000 B C) near Heidelberg Portions of the entire skeleton were preserved, none of which presented important lesions except those of the upper thoracic series (Figs 200-202) which show the lesions that have been interpreted as the oldest evidence of Pott's disease

Fig 202 —Radiograph of the necrotic area of above series   (After Bartels)

The lesions involve especially the third fourth fifth and sixth vertebræ The necrotic processes have produced a right kyphoscoliosis resulting in a decided bending toward the right due to the lateral absorption or necrosis of an entire vertebral body the fifth

In another Neolithic grave near L Aumède Prunières found an anky losed talotibial joint with a healed lesion of an old chronic ulcerated area which had necrosed the lower end of the tibia This has been regarded as an example of Neolithic articular tuberculosis

A diagnosis of Pott's disease made on such meager evidence can only be accepted with hesitancy. It may be regarded as extremely suggestive and we are entitled to say that vertebral tuberculosis is suggested by this discovery 7000 years ago.

Fig. 203—Mummy of the priest of Ammon from an Egyptian cemetery of the XXIst Dynasty (1000 B.C.) showing at the point of the arrow a huge psoas abscess due to tuberculous infection in the upper lumbar region. (After Smith and Ruffer.)

The earliest definite evidence of vertebral tuberculosis is that described by Elliot Smith and Ruffer in a mummy of a priest of Ammon from Ancient Egypt (XXIst Dynasty, 1000 B.C.) discovered near the ancient city of Thebes in 1891 by M. Grébaut and at present preserved in the anatomical museum of the medical school at Cairo.

The mummy (Fig 203) is that of a young adult male which shows in the scoliosis of the lumbar region and especially in the huge psoas abscess of the right pelvis the earliest definite indications of Pott's disease. The lesion in the third and fourth

Fig 204—Diseased lumbar vertebræ of a North American Pre Columbian Male Found at Grand Gulch Utah The original is in the American Museum of Natural History

lumbar vertebræ is accompanied by hypertrophic processes and by necrosis of the bone

On the right side at the level of the first lumbar vertebra is seen the beginning of a huge swelling apparently a psoas abscess which had destroyed all the muscle fibers of the right

psoas, though they are well preserved on the left side. The abscess, so common in Pott's disease today, must have had a capacity of several liters. The abscess was not ruptured during the embalming process, since the pitch and trash which filled the

Fig 203 —Diseased (tuberculous) lumbar vertebræ of an early (Pre Columbian?) North American Indian from a mound in Northern Louisiana suggesting Pott's disease. (After Hrdlicka)

abdomen of the mummy was deeply embedded in its substance. This indicates that the abscess was still soft at the time of death.

No bacteria of the type of the tubercle bacillus were found in the unpromising mummified material although portions of the abscess were examined microscopically. The spores and

mycelia found in the mass were doubtless introduced with the
embalming materials

The presence among the primitive North American Indians
in Pre Columbian times of a diseased condition of the spine
resembling Pott's disease is indicated in only two instances
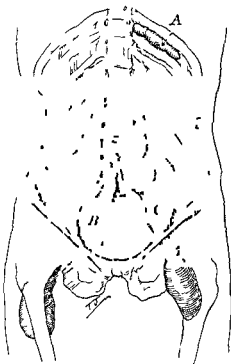
Fig 206 Diagram showing three types of abscesses due to vertebral
tuberculosis A Intercostal or lower thoracic abscess similar to the case
shown in Figs 200 and 201 B Lower lumbar abscess which passed out into
the femoral region through the sciatic notch C A psoas abscess penetrating
into Scarpa's triangle (Modified from Testut and Jacob)

The evidence is not definite enough to establish a diagnosis of
vertebral tuberculosis but is suggestive of this condition as may
be seen by reference to Figs 204 206

The specimen shown in Fig 204 represents the five lumbar
vertebræ of a *male Pre Columbian Indian* found at Grand

Gulch Utah The original of this figure is the property of the
American Museum of Natural History in New York City and I
am indebted to Dr Sullivan of that institution for the privilege
of studying it
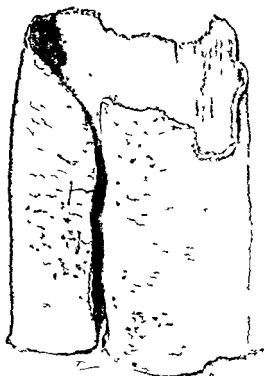
The specimen presents a moderate right scoliosis and con
siderable necrosis of the bone at the intervertebral region of the
third and fourth vertebræ Accompanying the necrosis to which
scoliosis is due is an extensive hypertrophic periostitis differing

in many respects from the *spondylitis deformans* so commonly seen among the ancient Egyptians The neural spines and lateral processes of all the vertebrae are rugose and beset with spinous processes indicating the presence of a rather intense inflammatory reaction

The other specimen (Fig 205) which suggests Pott's disease is that of a more recent Indian described by Hrdlicka from an early mound in northern Louisiana There is a marked lordosis and the specimen is extensively necrotic but there is no evidence to prove the presence of tuberculosis as the cause of the lesion

There is very little evidence to prove that the primitive peoples of ancient times made any effort to treat lesions of the spine by surgical means The idea of draining an abscess seems to have developed in relatively recent times That the North American Indians at least attempted to aid spinal deformations is suggested by a corset made of bark and provided with eyelets (Fig 207) for lacing which is described and figured by Freeman This corset suggests some knowledge of spinal diseases and indicates an attempt to aid in their cure

CLINIC OF DR GOLDER L McWHORTER

PRESBYTERIAN HOSPITAL

CHONDROMA OF THE THUMB

I ven though it were possible to do a resection with the history of a rapid growth in such a tumor I would advise a carpo-metacarpal amputation The chances are that if there have been sarcomatous changes a more radical amputation will do no more in the prevention of a recurrence or metastases

Technic of Amputation of Thumb at Carpometacarpal Joint —

I am using ½ per cent procain with 3 drops of a 1 1000 epinephrin solution to the ounce The field has been prepared with two coats of tincture of iodin and surrounded with sterile towel
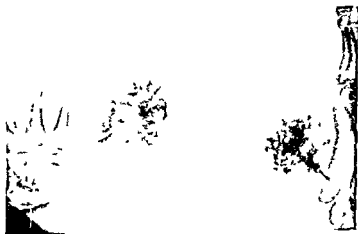

Fig 209 —This roentgenogram shows areas of calcification or ossification in the tumor These areas are quite large near the joint and observe the outline of the phalanx and metacarpal bone

I have an Esmarch constrictor placed around the arm so that it can be tightened if necessary However I prefer not to use it if I can catch the bleeders as I cut them

The method of local anesthesia which I am using is a combination of nerve-blocking and infiltration The sensory nerve-supply to the thumb comes from the median and the radial nerves I first block these nerves at the wrist It is unnecessary to encircle the wrist with the anesthesia because the ulnar does not supply any sensory branches to the thumb I extend the

anesthesia to the median nerve anteriorly and block it by deep injections (Fig 209) On the dorsal and lateral side of the wrist I anesthetize the sensory branches of the radial nerve and of the
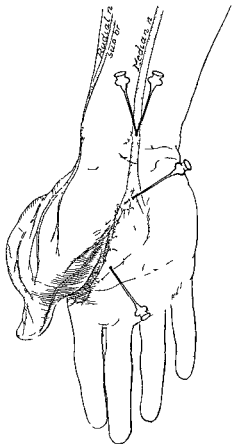

Fig 209 —Sketch illustrating the method of blocking the sensory nerves to the thumb on the anterior aspect of the wrist combined with infiltration around the thumb

cutaneous antibrachii lateralis (Fig 210) It takes at least ten minutes for the nerves to become completely blocked, and unless their sheaths are injected directly the anesthesia may be in complete, therefore I am infiltrating around the thumb

I now outline and cut the skin flaps making them about one
third longer than necessary to cover the raw surface There
are a few superficial bleeders which I am clamping I dissect
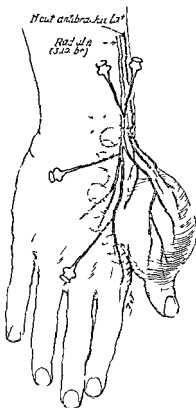out the radial artery as it passes between the first and second

Fig 210 —The dorsal sensory nerves are blocked at the wrist (compart
Fig 209)

metacarpals The artery is easily seen and I clamp and cut
it without any bleeding I cut the muscles and tendons at the
base of the thumb open the carpometacarpal joint and free the
metacarpal bone With blunt dissection of the deep part of the

tumor and by cutting the deeper muscles I separate the entire thumb and tumor from the hand   I am making no attempt to suture the tendons or ends of the muscles which are cut off short, there are a few bleeders to ligate   I will now close the skin without drainage, using interrupted silkworm gut sutures and a few waxed linen sutures to approximate the edges carefully
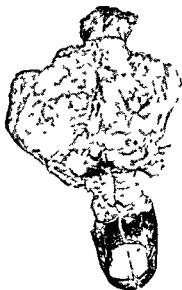

Fig 211—Specimen after removal   The skin and tendons lying superficially to the tumor have been removed   The lobules of the tumor are easily seen

The tumor on examination is found to be 24 cm in circumference and 5 cm long (Fig 211)   It is covered only by the skin and the tendons which are pushed out and lie entirely superficial although the latter form shallow grooves in places   The tumor is distinctly lobulated and at the periphery there are multiple lobules budding off from the larger ones   On longitudinal section through the phalanx and metacarpal bone the joint and

the greater part of both bones are found to be entirely surrounded by the tumor (Fig 212) This does not involve the medullary cavity On both the metacarpal bone and the phalanx the cortex has been compressed in one place The cortex however is largely intact although near the joint where it normally becomes thinner it appears to be absent There is no motion between
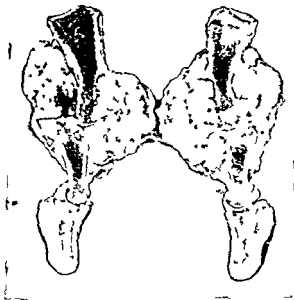

Fig 212 Specimen sectioned in sagittal plane (compare Fig 211) The bones are seen to be incased by tumor as in a cast A subluxation is present due to the tumor overgrowth at the joint

the metacarpal and phalangeal bones On examination this is seen to be due to the overgrowth of the tumor around the joint producing a subluxation and surrounding it like a cast There is destruction of the joint cartilage only at the periphery of the joint due to pressure and ingrowth of the tumor The periosteum may be dissected out in most places between the tumor and the

cortex except near the joint. There are areas in the tumor which are evidently bone and others of calcification. These tend to run radially from the center. Many lobules also radiate from the center. Blood vessels run between these lobules and occur in the region of the calcified and ossified areas. Two or three of the larger lobules are cystic, containing a clear fluid and their inner walls have a worm eaten appearance.
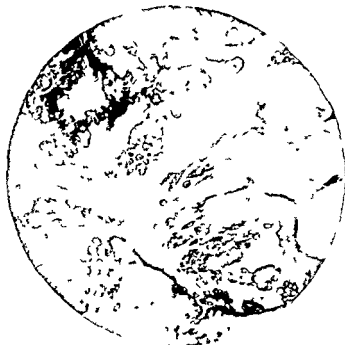
Fig 213—Photomicrograph. This section was cut from the tumor near the joint. It contains cartilage areas of calcification and bone trabeculæ.

On later microscopic examination the cartilage is found to be hyaline in structure. The arrangement of the cells is embryonic in many parts but very irregular with usually one or two cells in a lacuna. In some regions there is calcification of the inter cellular substance. The cartilage cells in the region of ossification are swollen irregular in size and arrangement in groups

and their intercellular substance appears to be absent The bone trabeculæ appear to encroach and form small islands of these cartilage cells The region of ossification is well supplied with blood vessels In places a part of the cartilage is undergoing change of structure as evidenced by swollen cells a tendency to grouping a loss of intercellular substance and a transition into bone (Fig 213) The cartilage nearby retains its embryonal structure

Postoperative Course —The wound healed by primary union The use of the hand was started in a few days and the patient had normal use of the remainder of his hand at the end of three weeks

Prognosis —The fact that this tumor started to grow rapidly about six months ago after remaining a small nodule for one and a half years speaks for a very actively growing tumor While the histologic appearance of the areas examined is benign even if there is no sarcoma present in other areas late metastases of pure chondromata may appear

DISCUSSION

Tumors consisting largely of cartilage are called chondromata These tumors have been subdivided by some writers into ecchondromata and enchondromata Ecchondroma occurs as an overgrowth or tumor arising where cartilage is normally present and persistent When there is a direct continuity of the growth with this cartilage Adami thinks it should not be classed as a true tumor but as a local hypertrophy It is difficult both grossly and microscopically at times to determine whether there is a connection between the growth and the parent matrix Ecchondromata may arise from the cartilage of the ribs larynx trachea intervertebral disks and the epiphyseal cartilages It is worthy of note that they never develop from the articular cartilages of joints

Enchondromata in contrast are independent nodules or tumors Their origin is in dispute In general it may be said that they develop in regions where normally there is supposed to be no cartilage In bones they may grow from the marrow

In the last condition they are at first surrounded by a shell of bone through which the growth later breaks In regard to etiology the following theories may be considered

1 They may arise from other forms of connective tissue especially fibrous tissue Adami believes that in a glandular organ there is a metaplasia of connective tissue cells although the cause is unknown

2 Embryonic rests of cartilage may persist in bones or they may be misplaced into the salivary glands the skin etc Developmental rests may form the origin as in cases of rachitis where there is a preponderance of cartilage with irregular ossification

3 Weber states that a history of trauma may be obtained in 50 per cent of cases

4 Inflammatory processes may have occurred previously in some cases

5 Heredity is a factor as many cases occur in the same family and also through several generations

6 Defective closure of the branchial clefts may be a factor in enchondromata of the skin and neck

7 MacCallum believes that chondromata may arise from the cells which are so readily capable of producing cartilage and later form bone as following fractures where the periosteum and endosteum may produce cartilage

The most frequent locations for enchondromata are in the bones where they are common in the phalanges and metacarpals of the hand also near the ends of the femur in the pelvis shoulder girdle and maxillæ In the soft parts they may occur in the salivary glands testis mamma lung fascia and skin

Chondromata may degenerate and be largely myxomatous or cystic There may be calcification or true bone Not uncommonly the tumor may undergo malignant change and any type of sarcoma cell may predominate The metastases may then be wholly sarcoma cells without the cartilage

J E McWhorter has transplanted a mammary chondro-osteosarcoma of a dog through three generations Chondromata usually appear during childhood or early adult life but may be congenital They are frequently multiple The size of chondro-

mata is variable Small chondromata are spheric but as they
grow they become irregular and lobulated The larger ones may
have areas of softening and contain cysts or the cavities may open
on the surface of the skin The consistency is of a stony hardness
unless degeneration is present On section, they have a whitish
or a somewhat translucent appearance Chondromata receive
their blood supply from the surface In the large tumors how
ever, there may be numerous vascular fibrous trabeculæ dividing
the cartilage into a number of lands or lobes The fibrous
capsule carries the nutrient vessels Their growth occurs largely
at the periphery along the zone of perichondrium, although the
deep cartilage cells may multiply actively

The histology is variable, depending upon the type of cartilage
upon whether degeneration has occurred whether calcification
or ossification is taking place and whether evidence of malig
nancy or mixed cells as in mixed tumors of the salivary glands
are present.

The usual type of cartilage is hyaline in chondromata arising
from bone but elsewhere it may be elastic fibrous or a combina
tion There may be fibrous areas in the hyaline structure and
also at the periphery where the cartilaginous structure merges
into the fibrous investing membrane The cells may be large
small rounded spindle shaped or stellate They may be abun
dant or scanty The cartilage lacunæ may be various shaped
and contain one or many cells of varying sizes These spaces
may fuse following proliferation of the cells and become large
cavities or cysts In chondrosarcoma there is a gradual transi
tion from normal cartilage cells in the center to a more mucoid
tissue and finally at the periphery true sarcoma cells From
the outer vascular sarcoma tissue there occur gradual transition
and substitution of the avascular cartilage substance This is
evidence against the view that the growth is primarily sarcoma
tous (Adami) Various types of degeneration mucoid myx
omatous or lipoid may occur with the formation of cysts or
perhaps ulceration through the skin and sepsis Areas of calci
fication and ossification are common in the large tumors The
growth may become calcified (enchondroma petrificum) or

ossified, especially in ecchondromata (ecchondrosis ossificans, Kaufmann)

It is often impossible to determine histologically whether metastases may occur or not since in spite of a benign appearance of a chondroma it may recur or metastasize. These metastases may be pure chondroma as well as sarcoma, and are especially common in the lymph glands, muscle, lung and liver. Metastases of pure chondromata are explained by the observation of Virchow of ingrowth of cartilage into the veins. They may appear several years after removal or development of the chondroma.

CLINIC OF DR EDWARD LOUIS MOORHEAD

Mercy Hospital

ACUTE APPENDICITIS AND GALL-STONES

Summary A patient presenting typical signs and symptoms of acute appendicitis Appendectomy—the right rectus incision—value of abdominal exploration in these cases—discovery of condition of chronic cholecystitis with calculi in present case—cholecystectomy Differential diagnosis of acute appendicitis

The patient a married American woman of twenty eight years was admitted to the medical service yesterday, and gave the following history

Two days previous to admission to the hospital she was seized with pains of a sharp cramping character in the lower abdomen on the right side She had a chill, some fever and vomited several times Her bowels were constipated She states that she had an attack similar in character about three months previously, and at that time a diagnosis of acute appendicitis was made and operation advised but she would not consent

She is the mother of 4 children There is no history of miscarriage or abortions Menstruations have been regular and not attended by any unusual discomfort or pain There is no history of any previous illness

The physical examination as recorded on the medical service, showed the following The patient is a fairly well nourished woman Head and neck are negative A few rales are heard diffused over both lungs Heart tones are normal and there are no murmurs The abdomen shows some distention and tympanites with marked rigidity in the right lower quadrant Pain is present and increased upon the slightest pressure over the

same area   The limbs are drawn up by the patient apparently for relief of the pain   The general appearance of the patient is that of one acutely ill

Urinalysis shows specific gravity 1028 acid reaction trace of albumin some white blood cells no red blood cells few epithelial cells

Blood examination shows leukocytes 9250 erythrocytes 5 150 000 hemoglobin 85 per cent.

Pulse is 120 temperature 101 2° F respirations 28

She was transferred to the Surgical Service for operation with the diagnosis of acute appendicitis

The patient has received the usual preliminary preparation and now that she is fully anesthetized we will proceed with the operation   In these cases especially in the female I prefer to make use of the right rectus incision only that it is extended a little higher up than is the custom   Through this incision one is able not only to remove the appendix but also to examine the gall bladder above and the uterine appendages below and if a more extensive operation is demanded the incision may be extended in either direction as required

Upon opening the peritoneum the omentum is found to be adherent low down on the right side giving evidence of the existence of an acute inflammatory process   The omentum is gently separated from the underlying bowel exposing an acutely inflamed appendix   The appendix is freed from its adhesions and delivered with the cecum   Two laparotomy pads are now placed over the wound to protect the abdomen   The meso-appendix is ligated and cut   A purse-string suture is passed around the base of the appendix   The appendix is now ligated and amputated   The stump is treated with carbolic acid and alcohol then inverted and the purse string suture tied   The cecum is returned and the omentum drawn down   Before finishing operations of this character it is always advisable to examine the gall bladder   Passing my fingers upward this come in contact with the gall bladder and I find it to be full of stones   This condition will necessitate extending the incision a little higher in order that the condition of the gall bladder may

be cared for   Of course it would be quite improper to allow
this condition of the gall bladder to go unattended and close
the operative wound at this stage   The association of gall
bladder disease and inflammations of the vermiform appendix
is of frequent occurrence and I want again to emphasize
the value of the high rectus incision as made in this case
because of the opportunity it gives to meet with added con
ditions that may be found within the abdomen at the time of
operation

The gall bladder is freed from some adhesions the evidence
of pericholecystitis   Apparently there is very little fluid in
the gall bladder   In view of the fact that an acutely inflamed
appendix has been removed it will be preferable to drain this
gall bladder after the removal of the stones   Accordingly the
fundus of the gall bladder is picked up with two tissue forceps
and incised   There escapes some thick glossy mucus evidence
of a chronic inflammatory condition and nine stones are found
free in its cavity   The stones are each about ⅜ inch in diameter
They are easily removed but very little bile is present   There
remains one stone low down in the cystic duct   It seems that I
am unable to dislodge it and therefore it will be necessary to
remove the gall bladder   Had we known that this last stone
was so firmly lodged in the cystic duct the gall bladder would
have been removed without having first opened it   However
the stones were so intimately packed together that this could not
be determined

A clamp is now applied to the open end of the gall bladder
thus closing it   The cystic duct below the impacted stone is
isolated clamped ligated and cut   The cystic artery will be
ligated separately   The peritoneal attachment of the gall
bladder to the liver is divided and closed with a continuous
suture of catgut   A rubber drainage tube is placed down to the
point of severance of the cystic duct   This drainage tube is not
anchored in the bottom of the wound   It is attached to the skin
incision   The reason for this is that the tube will in all probabil
ity be removed in forty eight to seventy two hours   In some
of these cases there will be free drainage during the first twenty

four to forty-eight hours and hence the necessity of having the tube in place After completing the toilet of the peritoneum the abdominal wound is closed layer by layer in the usual manner The drainage-tube is anchored to the skin in the upper angle of the wound The usual dressings are applied

This case teaches a lesson always to examine the gall bladder if possible during operations on the vermiform appendix If it were not for the fact that we found at this operation an acutely inflamed appendix the pathology of which there can be no doubt one would be inclined to believe that there was an error in diagnosis However in this present case we are confident that no error has occurred but that the case was one of acute appendicitis associated with a chronic gall bladder disease Many of you here present no doubt can remember having seen at times cases where the appendix has been removed with no apparent pathology present in it and yet where the operating surgeon may have been given a typical history such as this case presents Never be satisfied where you do not find sufficient pathology in the appendix until you have explored the other abdominal viscera such as the gall bladder kidney and uterine appendages Occasionally a patient presents himself to the surgeon with a history of having been operated upon for appendicitis and yet complains of the same symptoms he had previous to the operation What is the explanation? Either faulty technic at operation with resultant adhesions or an error in preoperative diagnosis probably due to a failure to obtain a proper history and the making of a satisfactory examination and analysis of the case In a typical case of appendicitis if the patient is kept under observation for a few hours or a day the signs and symptoms are so distinctive that an error in diagnosis is not likely to be made

Sudden perforations of the gastro-intestinal tract from other causes than appendicitis as ulcer of the stomach the duodenum or a typhoid ulcer may closely simulate acute perforative appendicitis but in these cases much will depend upon our knowledge of the previous history of the case and our ability to locate the origin of the process in the right iliac fossa In the early

days of typhoid fever without perforation an error is quite possible localized pain and tenderness in the right iliac fossa vomiting and fever are all present in certain cases Widal's reaction may be negative In these cases leukocytosis characteristic of suppuration and an increased pulse rate may aid in the diagnosis of appendicitis

In affections of the gall bladder reliance must be placed upon a history of repeated attacks of gall bladder pains, the pains radiating around the waistline and under the right scapula Jaundice may occur there will be signs of intraperitoneal irritation and the pain tenderness and rigidity will be at a higher point than in appendicitis Sometimes the gall bladder is palpable In women it is often difficult sometimes impossible to differentiate between disease of the right tube and ovary and appendicitis This is especially true because an inflamed appendix often becomes adherent to the tube and ovary or on the other hand an inflamed tube or ovary may become adherent to and involve the appendix A complete previous history combined with a careful abdominal and vaginal examination will aid in clearing up the diagnosis Fortunately both these conditions may be reached with comparative ease through the right rectus incision as used in this case

Movable kidney renal calculus and ureteral calculus have all been mistaken for appendicitis Movable kidney is usually found in neurasthenics and women suffering from general enteroptosis The pain accompanying renal colic is often attended by vomiting and prostration If the stone is in the pelvis of the right kidney or in the right ureter the condition may closely resemble appendicitis Absence of fever and leukocytosis of tenderness and rigidity in the right iliac fossa and especially the sudden cessation of pain common in renal colic will usually suffice after a few hours to make the differential diagnosis

In children the occurrence of blood in the stools is the most distinctive difference between intussusception and appendicitis The sausage shaped tumor of the former is movable and is not especially tender The pain of intussusception is very intense

but is usually intermittent or remittent the pain of appendicitis is continuous

Inflamed retroperitoneal lymph nodes in the right iliac fossa may simulate appendicitis Vomiting is usually absent Pain if present is of a dull character A palpable tender tumor sometimes with marked septic symptoms may be present. The acute onset characteristic of appendicitis however is absent.

TWO CASES OF ACUTE LYMPHANGITIS

Summary Severe system c acute lymphangitis—the s gns and symptoms
Anatomy of lymphatics of upper extremity   Demonstration of two cases
of lymphangitis following slight injury of the hand   Treatment—rest
and hot dressings   incis on usually contraindicated

THE two cases which are presented for examination this morn
ing illustrate that type of lymphangitis which is designated as
' severe systemic acute lymphangitis " In this type the infect
ing organism is, for the time being of great virulence   These
cases are characterized by alarming systemic symptoms often
associated with a trivial local manifestation   There is usually
a chill, a decided elevation of temperature the patient is pros
trated and presents a picture of severe systemic poisoning
The patient may react favorably after a few days or weeks of
intense sepsis and recover or may succumb to an intense
bacteriemia septicemia or pyemia

The lymphatics of the upper extremity may be divided into
two sets superficial and deep   The superficial lymphatic glands
are few in number and of small size   There are usually two or
three in front of the elbow and one or two above the internal
condyle of the humerus near the basilic vein   The deep lym
phatic glands are also few in number   A few small ones are
usually found in the course of the radial and ulnar vessels in the
forearm and in the arm there is a chain of small glands along
the inner side of the brachial artery   The axillary glands are
of large size   A chain of these glands surrounds the axillary
vessels embedded in a quantity of loose areolar tissue, they
receive the lymphatic vessels from the arm others are dispersed
in the areolar tissue of the axilla the remainder are arranged in
two series   a small chain running along the lower border of the
pectoralis major as far as the mammary gland receiving the
lymphatics from the front of the chest and mamma, and the
others are placed along the lower margin of the posterior wall of

the axilla which receive the lymphatics from the integument of the back. Two or three subclavian *lymphatic glands are placed immediately beneath the clavicle* it is through these that the axillary and deep cervical glands communicate with each other In malignant diseases tumors, or other affections implicating the upper part of the back and shoulder the front of the chest and mamma the *upper part of the front and side of the abdomen or the hand forearm and arm* the axillary glands are liable to be found enlarged It is of great importance therefore that they be carefully examined for in operating for these conditions it is quite essential that these glands be removed The super ficial *lymphatics of the upper extremity commence in the fingers* two vessels running along each side of each finger one on the palmer and the other on the dorsal surface Those on the palmar surface form an arch in the palm of the hand from which are derived two sets of vessels which pass up the forearm taking the course of the subcutaneous veins The lymphatics from the dorsal surface of the fingers form a plexus on the back of the hand and winding around the inner and outer borders of the forearm unite with those in front Those from the inner border of the hand accompany the ulnar veins along the inner side of the forearm to the bend of the elbow where they join with some lymphatics from the outer side of the forearm they then follow the course of the basilic vein communicate with the glands immediately above the elbow and terminate in the axillary glands joining with the deep lymphatics The superficial lymphatics from the outer and back part of the hand accompany the radial veins to the bend of the elbow the larger part of them here joining with the basilic group and the remainder ascend with the cephalic vein on the outer side of the arm some crossing the upper part of the biceps obliquely to terminate in the axillary glands while one or two accompany the cephalic vein in the cellular interval between the pectoralis major and delto d and enter the subclavian lymphatic glands (Fig 214)

The *deep lymphatics of the upper extremity accompany* the deep blood vessels In the forearm they consist of four sets, corresponding with the radial ulnar and interosseous arteries
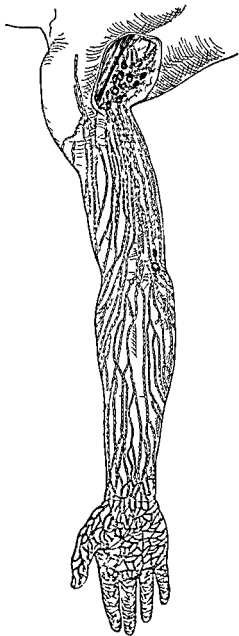
Fig 214—Sketch illustrating distribution of superficial lymphatics of upper extremity

they pass through the glands occasionally found in the course of these vessels, and communicate at intervals with the superficial lymphatics. In their course upward some of them pass through the glands which lie upon the brachial artery, they then enter the axillary and subclavian glands, and at the root of the neck terminate on the left side in the thoracic duct, and on the right side in the right lymphatic duct.

Our first patient, Mr J M , is a railroad conductor, fifty two years of age and married. He gives the following history.

Five days ago while engaged in his work as a passenger conductor it became necessary for him to unfasten a bunch of tickets. In doing this the palm of his left hand was scratched by the wire which bound the packet. The wound bled a little. He applied tincture of iodin and covered the wound with a gauze dressing. The accident occurred about noon time. His train arrived in the city at 10 P M and he went directly to his home and retired. During the night he had a severe chill and suffered great pain in the hand and arm.

I saw him at 9 o'clock the next morning about twenty hours after the receipt of the injury. At that time the pulse was 120 temperature 103° F , respirations 24. There was very little swelling of the hand or arm. On the palm of the left hand there was a scratch about ¾ inch in length. It apparently was not very deep. Extending upward on the anterior surface of the forearm and arm there were three or four red streaks. These were extremely tender on pressure. There was a great deal of pain especially at the bend of the elbow and in the axilla, where the glands were palpable. The leukocyte count at this time was 8500. Urinalysis showed a specific gravity of 1030, acid reaction, trace of albumin, no sugar, no casts.

The patient was immediately given 1500 units of anti tetanic serum, and a warm, moist dressing enveloping the hand, forearm arm and axilla was applied. These dressings were changed frequently enough so as always to be warm and moist.

It is now five days since the injury was received. You can still see the red streaks marking the course of the lymphatic vessels although their color has faded considerably. There

have been no areas of fluctuation and no incisions have been
made The tenderness and pain which were so marked in the
early stages of the disease have greatly diminished The tem-
perature has shown a gradual decline and is now practically
normal The dressings will be continued for a few days until
all signs of infection have disappeared The patient states
that he feels much better and can move the hand and arm
without discomfort

The second patient M G F is an Austrian twenty three
years of age He is single and a clerk by occupation He gives
a history of having received a stab wound in the middle finger of
the right hand ten days ago The wound which was made with
a pocket knife is about ½ inch long and ½ inch deep going through
the skin and subcutaneous tissue There was no special pain or
discomfort in the hand following the injury Three days later
he fell down a stairway and in trying to save himself his hand
struck the railing of the stairway This caused the wound of
the finger to bleed profusely and a physician who attended him
sutured the wound to control the hemorrhage The following
day the hand and forearm became painful and slightly swollen
Red streaks appeared in the forearm and arm and the pain
became marked at the elbow and in the axilla He says that
he had a chill followed by fever and that he felt very sick
On the second day following the suture of the wound he was
admitted to the hospital

On entrance to the hospital (five days ago) his temperature
was 102 5° F and pulse 120 The hand forearm and arm were
swollen and the red streaks extending from the hand upward
to the axilla were quite pronounced There was tenderness all
along the lymphatics and especially at the elbow and in the axilla
where the glands were palpable The sutures were removed
from the wound and a warm moist dressing enveloping the hand
forearm arm and axilla applied The dressings were changed
frequently enough so as always to be warm and moist

At the present time the glands at the elbow and in the axilla
are palpable but they are smaller and not as painful as they were

The red streaks along the forearm and arm are still visible but their color has faded considerably   There have been no localized areas of fluctuation and no incisions have been made   The patient is making satisfactory progress   The temperature is 99° F and pulse 80   The dressings will be continued until all signs of infection have disappeared   A question in this case may be   When did infection occur primarily, at the time of injury or later at the time the wound was sutured?

The infecting organism in these cases is usually the streptococcus commonly a hemolytic strain   The Staphylococcus aureus is found occasionally   The infecting organism usually gains entrance through a trivial wound such as a prick or abrasion   The reaction rarely goes to pus formation   Cellulitis with abscess formation and lymphangitis each present a sharply distinct type of infection   They are associated only in a small proportion of the cases going on to pus formation   *The local lesion is rarely more than a blushed area possibly a slight blister often so trivial as to pass unnoticed*   As compared with cellulitis, the reddening from lymphangitis is of a brighter hue   fading off gradually   into the normal   the tissue is not so tensely distended   nor is it so exquisitely tender to pressure as when pus is present   In the larger channels the straight bright red and slightly raised and tender streaks are characteristic, converging into the epitrochlear region and into the axilla   The general intoxication is usually greater than with localized cellulitis   When the lymphangitis does go on to suppuration this more commonly occurs where the vessels are least supported and lymph most readily pockets as in the web space the dorsum of the hand and at the valves along the trunks through the forearm

The treatment of these cases is based upon the diagnosis   If the inflammation is suppurative drainage should be promptly instituted   On the other hand if the inflammation is pure lymphangitis and incision is made before a localizing process has been well walled off incision is fraught with danger   It is found clinically that incision into the local site of invasion or deeply across the lymph-channels or into the tender lymph glands is followed by a violent increase in constitutional toxemia

In refraining from incision one is guided by the character of the lymphatic inflammation, the bright coloration, the light character of the throbbing pain, and the absence of the acute or exquisite deep tenderness which chiefly characterizes the early presence of pus Good surgical judgment is required to refrain, on the one hand, from incising these violently septic cases, and, on the other hand, to avoid unnecessary delay in draining deep collections of pus

The local treatment consists in putting the part to rest elevating the extremity, and the application of warm moist dressings enveloping the hand forearm arm and axilla

The general treatment consists of rest abundance of fluids, mild catharsis, and general supporting measures As a rule in all wounds of the hands or feet an injection of 1500 units of antitetanic serum is given, especially if the patient is seen soon after the wound has been received If one elects to direct systemic measures specifically against the infecting organism, streptococcic antitoxin may be given

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CLINIC OF DR FREDERICK HOWARD FALLS

Cook County Hospital

RUPTURED INTERSTITIAL ECTOPIC PREGNANCY[1]

Summary Examination and probable diagnosis Operation—surgical pathology disclosed Postoperative treatment Discussion of general knowledge of cases of this type

In my discussion of the subject of ectopic pregnancy this morning I am showing a patient which some of you saw me operate on a few weeks ago It is a case of interstitial ectopic pregnancy I have the specimen removed here for your inspection

Interstitial ectopic pregnancy is a relatively rare condition According to Wynne there have been 85 cases reported up to 1918 that can be considered authentic

The condition occurs in about 1 16 per cent of all cases of ectopic pregnancy All causes which operate to induce ectopic pregnancy in other portions of the tube such as inflammations tumors diverticulæ malformations etc may operate in the case of interstitial ectopic pregnancy Two cases have been reported following removal of tube and ovary on the affected side

This patient entered the hospital on May 14 1918 with the following history

She is twenty eight years of age a housewife and a native American On December 13 1917 she had her last regular menstrual period which was normal in time duration and amount On missing the next regular period she considered herself normally pregnant and experienced no unusual signs or symptoms until the latter part of March when she began to feel fetal movements and noticed that unlike the sensations experienced

penenced in previous pregnancies these movements were confined entirely to the left side

Three weeks before entering the hospital the patient arose one morning early to go to the bathroom She was suddenly seized with a severe pain in the left lower quadrant of the abdomen—and promptly fainted She recovered consciousness in a short time, summoned help and returned to bed Bleeding from the vagina began at the same time and was associated with the passage of clots and colicky pains in the lower abdomen She was sure she had not passed a fetus She had fainting spells every day for the next three weeks During this time the patient felt very weak and for the week preceding entry into the hospital had been nauseated and vomited a greenish yellow material The bowel was constipated and she passed a great deal of gas Insomnia and restlessness were pronounced She was under the care of a physician who, because he was unable to make a satisfactory diagnosis advised her to come to the hospital

Menstrual and Marital History—Menses began at seventeen, were regular and of the twenty eight day type lasting six to eight days She had menorrhagia but no dysmenorrhea Married October 9, 1909, and has 2 living children aged six and five years One miscarriage spontaneous four years ago Has had leukorrhea for past six years following the first pregnancy

Past History—No other diseases except occasional tonsillitis Acute articular rheumatism in 1910

Habits—No alcoholics no drugs Uses coffee to excess Does her own housework

Physical Examination—Made on entrance by the house physician

Head—Ears and nose negative Pupils react to light and accommodation Some carious teeth—two teeth missing some pyorrhea otherwise O K

Neck—No rigidity, adenopathy deformity or retraction No venous pulsation

Thorax—Normal contour—breasts good size but show no milk or colostrum on pressure Expansion good Lung excursion O K No areas of dulness or bronchial breathing

Heart—Apex beat palpable in fifth left interspace in mid clavicular line   Upper left and right borders normal position First sound somewhat roughened   Rhythm regular—rate rapid Accentuated second aortic and pulmonic

Abdomen—Liver and spleen not palpable   Tenderness bi lateral between the anterior superior spines and navel   Uterus two fingers above the navel   No heart tones heard

Vaginal—Cervix not dilated   Many pea sized growths over external lips   Moderate bilateral tenderness   Bloody dis charge—no odor

Extremities—Upper and lower negative   No edema   Knee jerks present and equal

The patient was running a temperature of 101 6° F   pulse of 112 and appeared pale and toxic   The probable diagnosis of incomplete septic abortion was made and the patient was treated according to the routine for such cases on our service namely tonic doses of ergot and hydrastis q_{xx} of each t i d The patient was placed in the semi Fowler position an ice bag placed over the fundus and fluids forced per os if stomach will tolerate   Otherwise fluid is given by continuous drop per rectum   Under this régime the temperature and bleeding sub sided and the abdominal pain which had been quite severe at first was considerably relieved   However her general condition failed to improve satisfactorily and I examined the case to confirm the diagnosis

Physical Examination—In general the findings conform to those previously noted   Patient still has continuous left sided pain and seems in rather poor condition   Bimanual examination reveals a large tender mass occupying the whole left lower quad rant of the abdomen reaching up to the umbilicus in the midline Cervix is slightly softened and not patulous   The history of pain and fainting and irregular bleeding in a woman supposedly pregnant together with the finding of a large mass to one side of the uterus and filling up the vagina and culdesac make the diagnosis of ectopic pregnancy quite probable

Because of these findings and probable diagnosis an immediate

laparotomy was advised and the operation was performed the next day

Operation and Surgical Pathology—The usual midline incision below the umbilicus was made under ether anesthesia On reaching the peritoneum it was found everywhere adherent to structures underneath and required great care in opening to avoid wounding the small bowel, which, together with omentum, was plastered over a large mass completely filling the pelvis and half filling the abdominal cavity, especially on the left side The adhesions present were very dense and extensive and consisted of masses of semi-organized clotted blood enclosing loops of bowel and omentum On separating these adhesions on the left side, thick pus welled up from a cavity to the left of and slightly above the umbilicus This was packed off by 'lap" pads, and we proceeded to free the pelvic contents On freeing the omentum and bowel severe hemorrhage was encountered from the dense adhesions and was controlled by hot packs With considerable difficulty the uterus was separated from pelvic adhesions and brought up The left cornua was greatly hypertrophied and appeared like a crater filled with large masses of coagulated and organized blood clots to some of which placental tissue was adherent These were removed in part and because of the marked laceration of uterine musculature it was decided to resect the whole of the hypertrophied left horn. Accordingly, about two-thirds of the body of the uterus was removed, the amputation stump sewed over and dropped back This procedure was elected instead of complete hysterectomy for two reasons First the patient had lost so much blood before the operation and during the breaking up of adhesions that she was in poor condition, and so the quickest and least extensive operation was called for Second the operation had to be done in the presence of pus, and therefore the limitation of the operative field was highly desirable

On completion of the pelvic work the sac on the left side of the abdomen just above the umbilicus was opened more widely and a large amount of thick, creamy pus was evacuated The partially digested fetus could be felt within the cavity and was

removed Cigarette drains were then placed in the pus cavity in which the fetus had lain, and also down into the culdesac of the pelvis, and the abdomen was closed in the usual manner (Fig 215)

The patient was in poor condition during the latter part of the operation, and 30 minims of camphorated oil and 1000 c c.
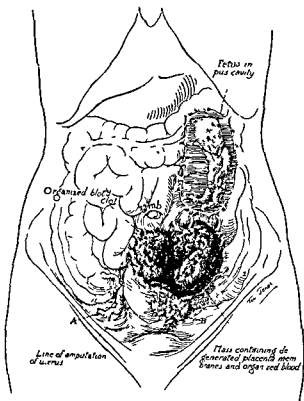

Fig 215 —Sketch illustrating condition found at operation

of normal saline solution were given hypodermically during the operation This we have found to be of great benefit in hemorrhage cases, especially ectopic pregnancy and placenta praevia cases Replacing the body fluids as soon after the hemorrhage as possible, providing you have the bleeding point secured, is very important.

She was placed in hot blankets and the semi Fowler position was used as soon as she regained consciousness Her condition was very poor for the next forty eight hours during which she received 3 per cent glucose and 2 per cent sodium bicarbonate solution per rectum by the continuous drop method Caffein soda benzoate gr ij was given hypodermically and small doses of morphin to control restlessness and pain There was a profuse discharge of foul smelling pus from the incision and ex amination showed colon bacillus and Staphylococcus aureus By the end of the first week her temperature was nearly normal as it is today The discharge has been profuse as you see it still is Her general condition has improved greatly She is eating full diet and her appetite is getting better under a bitter hematonic There is no bowel or bladder disturbance

Pathologic Specimens The uterus specimen is as you see about two-thirds of a five-month pregnant uterus Note the fact that the tube runs over the swollen cornua of the uterus and that it is not distended itself The round ligament also shows the usual relation to the uterine cornua outside the gestation sac facts that are necessary criteria for the diagnosis of the condition from the pathologic specimen The rupture is on the posterior superior surface and remains of the blood clots are seen in the cavity left after rupture and extrusion of the fetus Notice that the placenta is badly distorted and has undergone degenerative changes The fetus as you see is partially digested probably largely due to the action of the ferments set free by the disintegrating leukocytes of the pus which surrounded it in the abdominal cavity This is not necessarily so however as I have seen in some experimental abdominal pregnancies in dogs well over half term an almost complete absorption of the fetus even including parts of the bony skeleton and no evidence of free pus in the abdominal cavity

Discussion The etiology of this type of ectopic pregnancy is doubtless the same as for other types of ectopic pregnancy It has been suggested that interstitial ectopic pregnancy should be more common than the other types because the lumen of the tube is narrower in this region However there are fewer folds

of mucosa in this portion of the tube and less opportunity for bands of adhesions or extratubal tumors to cause distortion of the tube Frankel considers the presence of diverticula of the tubes in this region to be important predisposing causes In this case the history of leukorrhea ever since the birth of the first baby probably is significant of an inflammatory change in the generative tract that might have resulted in the abortion which occurred four years ago and the inflammatory reaction in the tubal mucosa which arrested the ovum in the interstitial portion of the uterus

Cases of this type of ectopic pregnancy all have a bad prognosis Prior to 1893 all cases had been found at autopsy The mortality is 11 9 per cent in a series of 82 operated cases

It is interesting to note the time elapsing between the rupture and the operation—five weeks This is unusual although a few such cases are on record It increases the danger from sepsis which is almost bound to occur as it probably did in this case from invasion of the extravasated blood clots by bacteria from the bowel wall or from an ascending infection from the vagina through the torn uterus The latter avenue of infection is apt to be overlooked but should be kept in mind and every precaution taken to guard against contamination of the vagina when making diagnostic vaginal manipulations The danger of secondary hemorrhage from adhesions is much greater in these cases On the other hand is undoubtedly true that in this case a certain amount of recuperation from the original hemorrhage had taken place

Operation as soon as the diagnosis is made is the treatment of choice if the patient is not moribund from shock and hemorrhage Speed is important and the abdominal route undoubtedly the best The type of operation selected depends on conditions found Hysterectomy partial or complete is the operation of choice in advanced cases Excision of the sac with suture of the cornua is advisable in the earlier months Normal saline solution given under the skin during the operation is a valuable adjunct in combating shock and hemorrhage